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GYNECOLOGY FOR NURSES

BY

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To

MARTHA AND VIRGINIA

PREFACE

THE nurse of today can do full justice to her professional duties only if she has an understanding of her patient's condition and of the aims of the attending physician. Without this insight, she merely carries out orders mechanically—with it, she becomes the intelligent coworker and helpmeet of the doctor. Herein lies the keynote of the professional relationship of physician and nurse; and herein, too, lies the problem of modern education of nurses.

A diagnosis pronounced by the physician should call forth in the nurse a clear conception, a sort of mental picture of the malady. This makes it necessary to devote more space than is usually given, to a description of the more common ailments in the realm of gynecology. Such a discussion which at no time must go beyond the limits of the nurse's professional preparation, puts comprehension in the place of mere memory.

In the question of treatment, only those methods in which the nurse takes a more or less active part, require elaboration. Conversely, the details of procedures which concern only the physician, would be entirely out of place in this work. This applies more particularly to the various steps of surgical measures.

Throughout this book a persistent effort has been made to present the subject in a clear and concise manner; and where technical terms had to be introduced, they were explained immediately. The arrangement of the subject matter is the same which I have followed in my lectures to nurses for the past twenty years. In many conversations with nurses, both teachers and graduates, the wish has been expressed that these lectures might be made available in printed form, and I offer this book to the nursing profession in the hope that it may meet with their requirements.

At the end of each chapter a list of questions is appended as an aid to teacher and student in reviewing the subject.

Special works on gynecological nursing are very few. I have read with pleasure the books on various phases of nursing by Harmer, Colp and Keller, Parker and Breckinridge, Montgomery, Crossen, Clark and Norris, and others, and acknowledge suggestions which I have incorporated in this volume. I, further, wish to express my sincere thanks to Miss Mary E. Dawson, R.N., formerly of St. Luke's Hospital, Miss Irene C. Walsh, R.N. and Miss Virginia E. Ford, R.N., both of the Jewish Hospital, and Sister M. De Chantal, R.N., of St. Mary's Hospital, who very kindly have read the manuscript and offered valuable criticisms and helpful suggestions. Finally, I desire to convey my genuine appreciation to the publishers for their unfailing courtesy.

GEORGE GELLHORN.

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GYNECOLOGY FOR NURSES

PART I

The Female Genital Organs in Health and Disease

CHAPTER I

THE STRUCTURE OF THE GENITAL ORGANS

Gynecology is that branch of medicine which concerns itself with the diseases peculiar to women. The term gynecology is derived from two Greek words meaning knowledge of woman. In order to do away with the existing confusion as to proper pronunciation, it is proposed to pronounce the word jĭn′-ē-kŏl′-ŏ-jĭ.

Diseases of women means disorders of the female sex organs. An understanding of such disorders must needs be based on the knowledge of the appearance, arrangement, and construction of these organs in the state of health. Hence, it becomes necessary to acquaint ourselves first with the *normal* anatomy of the female genital system.

ANATOMY

The genital organs are divided into the *external* and *internal* genitals.

External Genitals.—The external genitals (Fig. 1) are collectively called the *vulva* and are composed of:

(*a*) *The Mons* or *Mons Veneris.*—This is a thick bolster or cushion, largely made up of fat, which lies over the pubic bone and is covered with skin and, usually, a thick growth of short, coarse hair. The latter is called *pubic* hair, to distinguish it from hair in other localities, for instance, under the arms where it is called *axillary* hair.

(*b*) *The Major Lips* (latin: *labia majora*).—These are two thick folds, also composed largely of fat and covered with skin and hair, which extend from the *mons* downward.

(*c*) *The Minor Lips* (latin: *labia minora*).—These are two thin folds just inside of the major lips. The skin of the labia minora is much thinner than that of the labia majora. It is

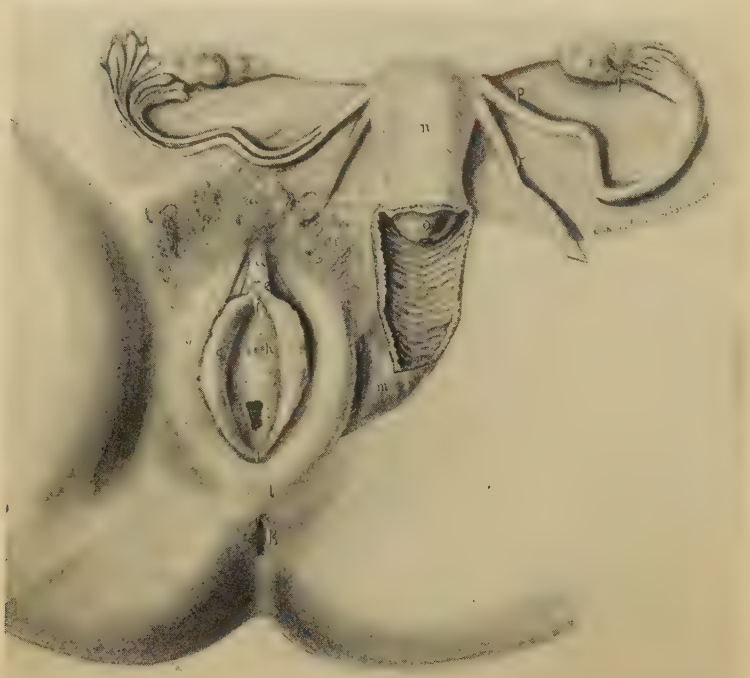

Fig. 1.—The female genital tract. *a*, Mons; *b*, labia majora; *c*, labia minora; *d*, prepuce; *e*, clitoris; *f*, frenulum; *g*, vestibule; *h*, meatus; *i*, hymen, *j*, fourchette; *k*, anus; *l*, perineum; *m*, vagina; *n*, uterus; *o*, cervix; *p*, Fallopian tube; *q*, ovary; *r*, round ligament.

not covered with hair and, in the young, has a pinkish color which, with advancing years, becomes dark brown, particularly in brunettes. The inside of the minor lips is quite delicate and partakes of the appearance of a moist mucous membrane. Above, the minor lips join each other and form a sort of hood which is called the *prepuce*.

(*d*) Beneath this prepuce and partially hidden by it, is the *clitoris*, a very small organ which looks like the first joint of the little finger of a newborn child. The clitoris corresponds in structure and origin to the penis in the male, but attains only a very limited degree of development. On its under surface the clitoris is connected with the inside of the minor lips by two very fine folds, the so-called *frenulum*.

(*e*) Below the clitoris there is a more or less flat surface, the *vestibule* in the midst of which we find an opening usually somewhat triangular in shape. This is the *meatus*, that is, the outer opening of the *urethra*. The latter, again, is the canal which leads outward from the *urinary bladder*. Directly within the meatus, a tiny dot on either side indicates the opening of the *Skene's ducts*, so called after Dr. Alexander Skene, of Brooklyn, who first described these small glands.

(*f*) A little below the urethral opening lies a much larger opening which represents the entrance into the vagina. This vaginal entrance is partially closed by the *hymen* or *maidenhead*. The opening within the hymen is quite variable in size and shape (Fig. 2). The hymen, itself is, as a rule, a very thin mucous membrane; in some cases, however, it may be $\frac{1}{8}$ of an inch in thickness. The hymen is torn by sexual intercourse and still more so by childbirth; the small remnants are called *carunculae myrtiformes*.

(*g*) Immediately outside of the hymen there is on each side a very small dot which marks the opening of the vulvovaginal gland, also called the *gland of Bartholin*, after a Danish anatomist who first described this structure in the eighteenth century. The Bartholinian glands are so small that ordinarily they cannot be felt.

(*h*) The minor lips, if spread apart with fingers, are seen to join each other in the form of a thin skin fold, called *fourchette* (fōōr-shét).

About $1\frac{1}{2}$ inches below the fourchette is the outlet of the bowel, the *anus*. The latter is surrounded by a strong muscle the *sphincter ani*, which gives the opening a puckered appearance.

The skin between fourchette and anus is called the *perineum* which covers a strong wedge-shaped mass of muscles and fibrous tissue that separates the rectum from the vagina.

Fig. 2.—Various forms of hymen. *a*, Semilunar; *b*, annular; *c*, indented; *d*, septate; *e*, carunculae myrtiformes.

Internal Genitals.—(*a*) The *vagina* is the connecting link between external and internal genitals. It is a tube, 4 or 5 inches in length with muscular walls which, on the inside, are lined with a mucous membrane. The vagina is not a rigid, round canal but a pliable passage way which is flattened from before aft in such a way that the anterior wall lies on the posterior wall. The walls of the vagina are raised in numerous

Fig. 3.—Side view of the female pelvis. (Photograph of a model.) *a*, Body of uterus; *b*, cervix; *c*, internal os. Note the direction of urethra, vagina and anal canal in reclining posture.

transverse folds. This permits of a great deal of stretching of the passage when the child is born. The upper, or anterior, wall is connected with the urethra and part of the bladder, while the lower, or posterior wall is connected with the perineal body (the wedge-shaped mass of muscle and fibrous tissue referred to above) and the rectum (Fig. 3).

The uppermost portion of the vagina is attached to the cervix. Thereby the *vaginal vaults* or *fornices* are formed; we speak of an anterior, posterior, right, and left fornix, respectively.

(*b*) The *uterus* or *womb* is a pear-shaped organ, 3 inches long, 2 inches wide, and 1 inch thick, which weighs about $1\frac{1}{2}$ ounces. The upper thicker and larger part of the uterus which lies in the pelvic cavity between bladder and rectum (Fig. 3), is called the *corpus* or *body* of the uterus. The uppermost part of the body is slightly convex or dome-shaped, and is called the *fundus*. The lower and smaller end is called *cervix* or *neck*, and the lowermost end of the cervix extends, as we have just seen, into the vagina which is attached around it.

The uterus is largely composed of strong muscular fibers which run in several directions. This arrangement results in an intricate weave of muscle fibers which renders possible the enormous expansion of the organ in pregnancy. Besides muscle tissue, there are also connective tissue fibers, blood and lymph vessels, and nerves in the uterus. The cervix contains more connective tissue and less muscle fibers than the body, and is, therefore, harder than the latter.

The uterus is a *hollow* organ. At the tip of the cervix within the vagina there is an opening which marks the beginning of the channel. This is the *external os*. Where the channel runs through the length of the cervix, it is called the *cervical canal*. The cervical canal is continued into the *uterine* cavity. At the point of juncture, the cervical canal becomes constricted; this is the *internal* os (Fig 3, *c*). In women who have not borne children, the external os is round and admits the point of a lead pencil. The cervical canal itself is a little wider. The uterine cavity, however, is much more spacious. It has a triangular shape, the apex of the triangle is downward and corresponds to the narrow internal os. After childbirth the entire passage, as a rule, remains wider. Moreover, tears about the external os may change the configuration of the latter into a slit or otherwise irregularly shaped opening.

The uterine canal in its entire length is lined with mucous membrane. This means that the uterine mucous membrane, like a mucous membrane in any other part of the body, is soft, thin, reddish in color, and moist. The lining of the cervical canal is called *cervical mucosa*, that of the uterine cavity *uterine mucosa* or *endometrium*. Both contain glands and many small bloodvessels. The glands in the cervical mucosa produce mucus, those in the endometrium a watery or serous secretion.

(*c*) The *Fallopian tubes* emerge from the upper angle of the uterine body on either side. They are named after the Italian anatomist Falloppio who, in the sixteenth century, was the first to study these structures carefully. (There are other "tubes" in the body, for instance, the Eustachian tube in the ear.) The Fallopian tubes, also called *oviducts*, are thin-walled channels which run toward the sides of the pelvis. They are 3 to 4 inches long, are thinnest near the uterus, and become larger toward their outer end. The latter is named the *abdominal* or *fimbriated extremity* because its margin is surrounded by fringes or *fimbriae*. The canal of the tubes is lined with mucous membrane and connects on one side with the uterine cavity while on the other it opens into the pelvic cavity; and as the latter is but the lower part of the great abdominal cavity, it is clear that there is an unobstructed passage way from the outer world through the vagina and the uterine canal into the abdomen.

(*d*) The *ovaries*, two in number, are the most important parts of the genital system. They correspond to the testicles in the male, and represent the sex glands in the female as they contain the eggs or *ova* (singular: *ovum*). They resemble in shape and size a large almond in the shell, that is, they are flattened, oval bodies, about $1\frac{1}{2}$ inches long, $\frac{3}{4}$ inch wide, and $\frac{1}{2}$ inch thick. Their color is a dull white, and their surface has a wrinkled, irregularly corrugated appearance. They lie on either side of the uterine body and behind the Fallopian tubes and are connected with both these organs by means of various folds and cords.

The ovaries are solid. They consist of connective tissue, bloodvessels, nerves, and a few muscle fibers, but, most important of all, they contain the eggs. Of these eggs there are about 30,000 in each ovary at the birth of the child. No new eggs are formed during later life. In order to understand how so many ova can be in the small ovaries of the newborn, it is necessary to realize that these eggs are merely very small cells, so small that they must be magnified several hundred times before they can be seen through a microscope. They appear then as ordinary round cells with a cell body and a nucleus (Fig. 4) which are closely packed together. In this original form they are called *primordial follicles*. There is nothing

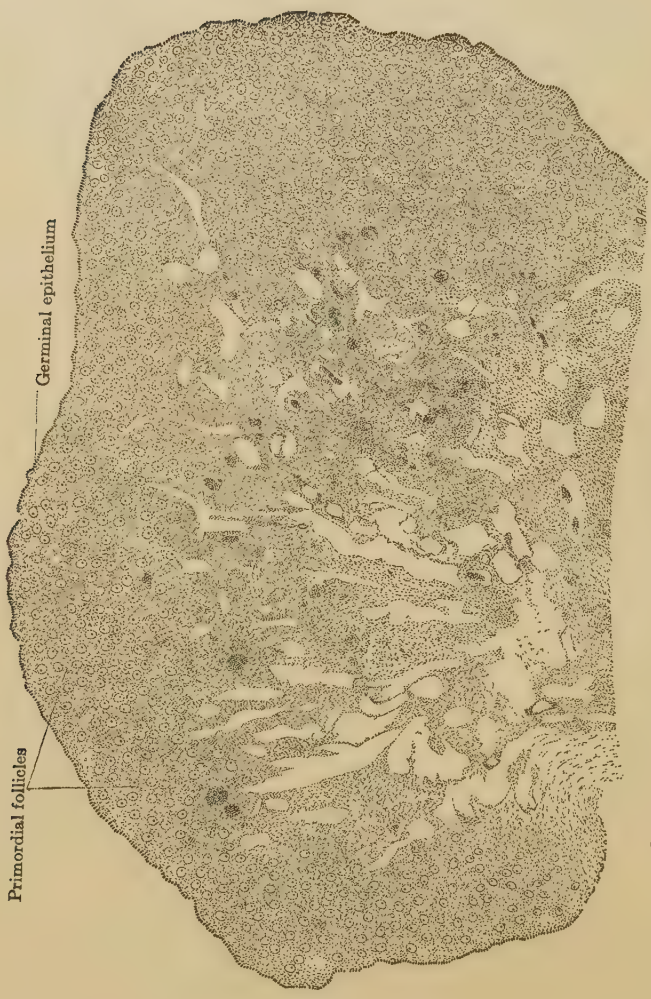

Fig. 4.—Ovary of newborn, showing primordial follicles. (DeLee.)

in their appearance to indicate the remarkable changes of which these cells are capable and which will be described in the following chapter. Nor should it be forgotten that what the child inherits from his mother and through her from preceding generations, is inherent in each of these tiny, microscopic cells. All that we know of heredity, is contained in, and transmitted by, these female germ cells and the corresponding male germ cells or *spermatozoa,* and this must make us appreciate to the fullest the dominant position of the sex glands among the genital organs.

QUESTIONS

1. What is meant by the term "Gynecology?"
2. Name the external female genitals.
3. What is the name of the muscle around the anus?
4. Where is the perineum found?
5. Which organs lie in the female pelvic cavity?
6. Describe the uterus.
7. What is the external os? Where is the internal os?
8. Describe the Fallopian tubes. At which end is the fimbriated extremity, and why is it so called?
9. What is the endometrium?
10. How large is the normal ovary approximately? What does it contain?

CHAPTER II

THE FUNCTIONS OF THE GENITAL ORGANS

Almost all the organs in our bodies function from our very birth, and most of them even before that. Heart, lungs, kidneys, gastro-intestinal tract, etc. are active from the beginning and, as they perform their work, increase in size until the body reaches maturity.

The genital organs form practically the only exception. They are not needed for the building up of the body. Their work, that of reproduction, comes later, and so, until the body is capable of reproducing itself, they remain asleep as it were. They are tiny structures in the newborn girl, and while they take on some growth in the years to follow, yet their rate of increase is far below that of the other organs. Then, when physical maturity is about to be attained, they commence to prepare themselves for their task. This period which we call *adolescence,* occurs at different ages in different races—in tropical countries, India for instance, about the ninth year, in the inhabitants of Southern temperate climates around the eleventh year, and still a year or two later in more Northern lands. Generally speaking, dark skinned races or individuals enter the period of adolescence earlier than lighter ones.

The tiny ovaries grow rapidly and reach adult size within a year; and of the many thousands of microscopically small egg cells contained in the ovaries, one begins to ripen, that is, it grows larger and forms about itself a little cavity which separates it from the rest. This cavity is surrounded by a fine membrane. To some part of this membrane the egg cell is fastened together with a few other cells which serve for its nourishment and attachment, while the remainder of the cavity fills with a slowly increasing amount of fluid. This whole structure is called a *Graafian follicle,* after Regner de Graaf, of Holland, who discovered it in 1672 (Fig. 5). The growing follicle pushes the other cells in the ovary aside as

it increases in size, and inevitably seeks its way towards the free surface—just as a seed planted in the ground, will always grow towards the surface. Finally, it protrudes beyond the

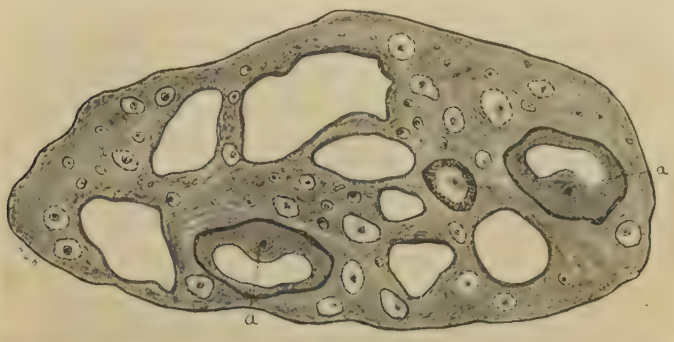

Fig. 5.—Cross section of ovary containing Graafian follicles in various stages of development. *a*, egg cell.

ovarian surface in the form of a grayish, transparent blister or vesicle which may exceed the size of a cherry stone (Fig. 6). As the fluid within the follicle increases, the frail follicle

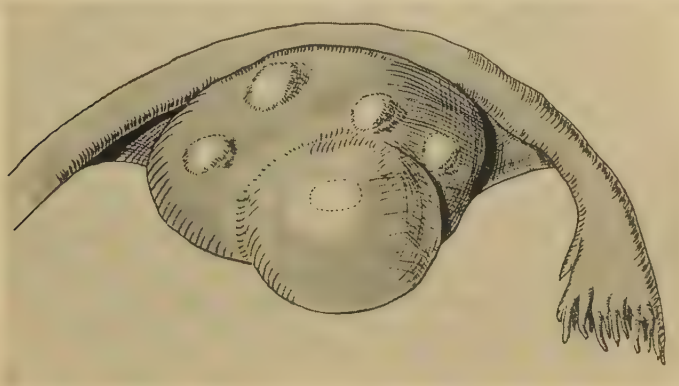

Fig. 6.—Ovary, showing one mature Graafian follicle ready to burst.

membrane is more and more thinned out until it breaks. Through the rent the pent-up fluid gushes out into the abdominal cavity and carries with it the little egg cell that had been

loosely attached to the inner wall of the follicle. This process of ripening and bursting of the follicle and the expulsion of the egg or ovum is called *ovulation.*

The ovum itself which is a tiny speck of white jelly, just discernible with the naked eye if placed on a black background, drops into the fimbriated end of the tube and thence is transported towards the uterine cavity.

The cavity of the ruptured follicle in the ovary fills up with blood which coagulates and later is replaced by cells of a yellowish color. The result is the yellow body or *corpus luteum* which is about the size of a hazelnut (Fig. 7). If

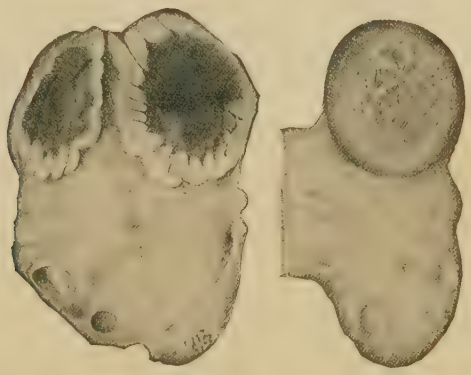

Fig. 7.—Ovary with corpus luteum. *a*, Laid open. *b*, From outside. (De Lee.)

pregnancy occurs, this corpus luteum persists until about the time the baby is born. If there is no pregnancy, the corpus luteum is gradually absorbed, and its shrinking leaves a small depression on the surface of the ovary. This is the reason why the outside of the ovary appears wrinkled (page 23).

Simultaneously with the growth of the ovary, significant developments take place in the uterus. While in infancy and childhood the cervix has been quite long and the uterine body but a small knob (Fig. 8), the latter now begins to grow more rapidly than the cervix until the organ takes on the pear-shaped form of the adult uterus (Fig. 9). The endome-

trium (see page 22) likewise, enlarges; and every time ovulation is under way in the ovary, the uterine mucosa becomes very much thicker and softer due to an increased flow of blood into the uterine bloodvessels. In other words, the uterus prepares a soft, warm nest for the ovum in case it be fertilized. We call this gradual enlargement of the endometrium the *premenstrual swelling*. If, however, fertilization of the ovum does not take place, the congestion of the endometrium

Fig. 8.—Uterus of newborn.

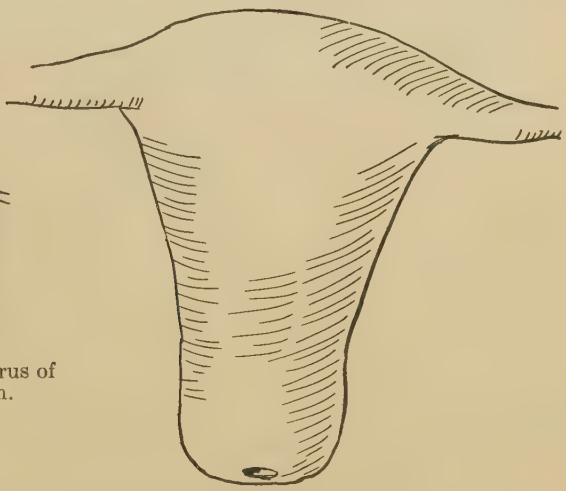

Fig. 9.—Adult uterus.

continues until the fine bloodvessels can no longer stand the strain: a number of them break, and bleeding occurs. This bleeding is the *menstruation*, also called the "menses," the "period," "monthly flow," "sickness," "catamenia." Its first appearance in this country is usually about the fourteenth year, but may occur a year or two earlier or later.

The establishment of ovulation and menstruation marks a milestone in the life of the girl. It means that the preparatory stage of adolescence has passed, and that the moment of *puberty*, of sexual maturity has arrived.

There is a very definite relationship between ovulation and menstruation. *Without ovulation there can be no menstruation.* It is very probable that nerve impulses go out from the

ovary to the uterus, apprising the latter that an ovum is about to be expelled and to get ready for its reception. It is quite certain that peculiar chemical substances called *hormones*, which are produced in the ovary and thence absorbed into the blood stream, have the same stimulating effect on the uterus.

Every process in nature has a gradual beginning. After the first ovulation it may take several months before another follicle matures; and this is the reason why in the beginning of puberty, menstruations may be few and far between, and even an interval of a whole year is by no means uncommon or abnormal. Gradually, however, ovulation and, with it, menstruation occur more regularly, and a definite type, the so-called *menstrual cycle*, establishes itself. In the great majority of instances this means that menstruation takes place every twenty-eight days, but it should be remembered that other types, such as the twenty-five or thirty or thirty-two day-interval, may exist.

The menstrual cycle, therefore, consists of (1) the process of ovulation, beginning with the growth of the graafian follicle in the ovary and ending with the expulsion of the ovum; (2) the premenstrual swelling of the uterus and, more particularly, the uterine mucosa; (3) the menstrual bleeding which originates in the uterus, provided fertilization of the ovum, that is, conception, has not taken place. If, however, the egg has become fertilized, there is no menstruation during the pregnancy and, as a rule, during the time the mother nurses the baby.

The menstrual bleeding lasts, on an average, from three to five days. The empty bloodvessels then collapse, and the lining of the uterus which, in part, has been cast off with the blood, regenerates itself after a few days of rest, until it begins again to prepare itself for the next menstruation. Menstruations which last two days or less, are abnormally short, and those, lasting longer than a week, abnormally long. The amount of blood varies. The total amount of menstrual flow is, in most cases, about four ounces. Only one half of this is real blood; the rest is made up by the watery secretion of the uterine glands (see page 22). A peculiarity of the menstrual flow is that it does not clot. When it is abundant in amount

and clotted, we have to deal with pathologic conditions. Normally, the color is bright red; only towards the end of the period is it darker. The odor is sweetish, pungent, at times definitely disagreeable.

The epoch of sexual maturity during which woman may carry on her natural function of reproduction, lasts, on an average, thirty years. Then a gradual decline in the activity of the genital organs sets in. To comprehend this decline more fully, we must realize that only the so-called "vital organs" function throughout the life time of an individual. Heart, lungs, kidneys, and the gastro-intestinal tract may perform their work throughout the biblical three score and ten and, under favorable conditions, they may remain active and normal for an even longer span of life until, finally, undergoing the decay of age. The organs of sense, as a rule, age more rapidly, and defects of sight or hearing may occur long before the vital organs show any signs of decreasing vitality.

The genital organs, again, manifest a different behavior. Just as they did not begin their activity until the body was ready to bear fruit, so they cease to function when it is no longer desirable, biologically, for an aged organism to create offspring. But this cessation is not instantaneous, as no natural phenomenon is ever abrupt. The ovaries being the most important of the sex organs, take the lead. The graafian follicles grow with lessened rapidity and regularity, and after a while no longer attain full maturity; at the same time, progressively less hormone is produced within the ovaries and secreted into the blood stream. We have seen before that the uterus depends for its cyclic monthly changes both on the expulsion of ova and on the ovarian hormones. When these two factors become more infrequent and less abundant, menstruation must be less regular and less copious; and, as a matter of fact, we observe in many women of between forty-five and forty-eight years, that the menstruations gradually fade away. This stage which may be stretched out over several years, is termed *climacterium* or *change of life.* The very gradual disappearance of the menstrual flow is but one of the many variations by which the menstrual function makes its exit. In some women there may be an intermission of two or more months after which several menstruations occur at regular intervals.

The flow may be normal or increased in amount. Again, regular menstruations with normal flow may alternate with scantier menses at delayed intervals. Finally, however, bleeding ceases altogether, and the so-called *menopause* is now definitely established. If after eight or ten months of such complete cessation, bleeding occurs anew, women are apt to speak of "return of menstruation." This widespread idea is utterly mistaken, and the nurse must know of its fallacy. *Menstruation once vanished at this stage of life for a number of months never "returns,"* and the bleeding may have a very serious portent, namely that of malignancy.

Just as the internal and external genitals are stimulated to growth at puberty, so they now undergo a diminution in size during the menopause. The uterus grows progressively smaller; the external genitals shrivel up and, with advancing age of the woman, assume senile appearance.

The changes which are wrought by puberty and menopause, are not limited to the genital organs but affect the entire body.

The little girl differs from the boy in the pre-adolescent stage in appearance and tendencies; but it is only with the awakening of the sexual function that the most marked differentiation occurs. Her body rounds out to typically feminine form by a distribution of fat particularly about the breasts, hips, and buttocks. The external genitals grow to mature size, and hair appears on the pubes and in the arm pits. Simultaneously the face loses its child-like type, the eyes become more luminous, the psychic and mental interests undergo a definite change. Flashes of exultation rapidly alternate with those of depression. Sustained effort at any occupation is difficult. Many a mother forgets that she herself used to indulge in "day dreams" and calls her child lazy; but the thoughtful nurse will bear in mind that in such moments of abstraction the newly awakened imagination has taken wing to unknown spheres. The instability of the nervous system may, on the other hand, evidence itself in irritability and indefinite complaints. Withal there is now a marked sense of modesty and an unconscious interest in the opposite sex.

Menstruation produces different symptoms in different individuals. In some, there is at that time an exaggerated feeling of well-being; but these are in the minority. Most

women have more or less discomfort, a sense of weight or even pain in the lower abdomen and back. They tire easily and are nervous and irritable. Often they complain of considerable headache. The breasts enlarge and become tender. The sweat glands secrete more copiously which results in a characteristic body odor. The face may be pale or flushed, with dark rings beneath the eyes; and sometimes there is an eruption of pimples on the skin. Such women are "unwell," and their symptoms are generally more marked before the onset of the flow which may appear with or without warning.

The changes in the organism at the menopause are equally pronounced. There is often a very decided increase of fat over the entire body, in particular, the breasts, the abdominal walls, and the hips, which, however, is characterized by a certain flabbiness, because the skin and the connective tissue beneath the skin lose their elasticity. Frequently, hair appears on the face, and the voice becomes deeper and harsh. Many women pass through the change of life without much disturbance. Others suffer intensely, particularly from flashes of heat and cold, flushings of the face and body, trembling, great excitability, profuse sweats, palpitations of the heart, shortness of breath and dizziness, sleeplessness, constipation, bloating, hiccup, and many other nervous symptoms. The unfounded fear which the laity has of particular dangers of this epoch, often leads to psychic depression which, in severe cases in women with a bad family history, may lead to melancholia and other forms of insanity. All these symptoms may persist for years, even after the menustration has definitely ceased.

Summary.—Menstruation is the periodical discharge of blood from the uterus, lasting from three to five days and recurring at intervals of twenty-eight days. It makes its first appearance at about the age of fourteen and occurs, in round numbers, for thirty years.

The establishment of menstruation is called puberty. The final disappearance of menstruation is termed menopause. Between puberty and menopause lies the epoch of sexual maturity.

Menstruation depends on the activity of the ovaries. The latter are the most important of the genital organs. The

ovaries contain the eggs or ova. Of these, one at a time ripens and is expelled from the ovary at regular intervals. This process is called ovulation. Ovulation calls forth an enormous flowing of blood toward the uterus which results in a marked swelling of this organ so as to prepare a nest for the baby if the egg happens to be fertilized. If there is no pregnancy, the nest is not needed, and the uterine congestion is relieved by the menstrual bleeding. This process repeats itself every month, except during pregnancy and lactation.

Without ovulation, therefore, there can be no menstruation.

Between the ages of forty-four and forty-eight, the activity of the ovaries in most cases declines gradually, that is, fewer ova ripen and are expelled. In consequence, menstruation occurs less often. This period of gradual decline is called change of life. When the production of ova and with it the menstruation finally cease altogether, we call this the menopause.

Puberty and menstruation as well as change of life or menopause are accompanied by local and general changes in the genital organs and by symptoms which are different in intensity in different individuals.

HYGIENE OF MENSTRUATION

Puberty is a crucial age in a girl's life. Never is she more impressionable to influences of all kinds than at this epoch. The first menstruation is bound to be a terrifying experience unless she has been warned to expect this bleeding. The symptoms accompanying the menses are often so unpleasant as to create in many girls and women the conviction that they are actually sick and to leave deep imprints in those who are somewhat inclined to neurasthenia. While it is true that, in menstruation, the dividing line between the normal and the abnormal[1] is rather fine, the nurse, in her educational role, will have ample opportunity to point out that menstruation is a physiological process which can be kept within normal bounds by proper hygiene.

During menstruation, one is more susceptible to cold, and unnecessary exposure in cold or inclement weather at that

[1] Abnormal menstruation will be discussed in Chapter IX.

time should be avoided. As chilling of the abdomen occurs easily during the menses, the clothing should take this into consideration as far as the prevailing fashion permits. Particularly harmful is the wetting of the feet, a fact which is not sufficiently realized by the laity.

In contradistinction, there is an age-old tradition that a woman should not bathe nor even wash her outer genitals while menstruating. This is altogether wrong. On the contrary, increased personal cleanliness is of greatest importance. There is absolutely no objection to the daily bath. A strong, robust girl who is used to cold baths, may keep these up. As a rule, however, the temperature of the bath should be pleasantly warm. Very hot baths should be avoided. Sea bathing is permissible during the menses only for those who from childhood on are used to it. Visitors to the seashore should abstain from it for the time being.

In addition to the usual bathing the external genitals should be washed with warm water lest the decomposing blood about the vulva cause irritation of the genital organs. Vaginal douches are not only unnecessary but may be directly harmful.

Particular attention should be given to the bowels. Constipation which is so common an ailment in the female, is usually more marked during menstruation and is apt to increase both the flow and the discomfort. An enema before the onset of bleeding often relieves the pain to a marked degree.

While it cannot be emphasized too strongly that menstruation is a natural function, yet, it is advisable to observe a sensible degree of rest during this time. Dancing, horseback riding, long hikes, skating, extended automobile trips may have unpleasant effects. In Europe the need for relaxing one's activities has long been recognized. As an example, the contract of opera singers provides for a rest during menstruation, because the voice loses its timbre during the period. In our country, all too little consideration is given to this subject. School girls, office and factory workers, sales girls and other wage earners ought to be given a chance for rest and recreation during the first days of menstruation.

HYGIENE OF THE CLIMACTERIUM

The disturbances of the menopause offer the nurse an opportunity for useful service. By explaining the harmlessness of the many nervous symptoms, however alarming, and by pointing out their certain disappearance after the menopause, she can quiet the fears of her patients. Common sense advice as to diet and general mode of life will help in many instances. Sponge baths with one part of vinegar in two parts of water frequently relieve the attacks of sweating. Proper medicinal treatment is always beneficial, and the nurse should urge such patients to consult a physician. Above all, she should dispel the time-honored notion that excessive bleeding at the time of menopause is natural or that bleeding after the establishment of the menopause merely means a return of the menstruation. Both these ideas are totally wrong. As will be discussed in Chapter XII, the nurse can render a most valuable service if she insists that in all such cases an expert be consulted without delay.

QUESTIONS

1. What is adolescence and puberty?
2. Define menstruation.
3. What is ovulation?
4. What is the relationship between menstruation and ovulation?
5. Define climacterium.
6. What relationship exists between the climacterium and the ovaries?
7. Describe the hygiene of menstruation.
8. Outline the hygiene of the climacterium.

CHAPTER III

INFECTIONS

The smallest living beings in the world are bacteria; they are also called microbes, micro-organisms or germs, and are usually considered just at the border between the vegetable and animal kingdoms. There are countless numbers of them all around us and about us. Though they are so infinitesimally small that they can be seen through a microscope only if magnified seven hundred or more times, yet, we have learned to distinguish in this innumerable multitude several well-defined species and ever so many varieties within each species. Those that are more or less round, are called cocci, and those which are a little longer than broad and somewhat resemble tiny rods, are termed bacilli. Not all of these bacteria are harmful to man, and some are even beneficial. Others are distinctly dangerous; they are capable of producing disease and are called *pathogenic*. Familiar examples of this latter group are the coccus of pneumonia, the bacillus of diphtheria, and the bacillus of typhoid fever.

When such pathogenic bacteria attack the human body, an infection takes place. In gynecological work, the number of infections of one sort or another is extremely large, but the infections are caused principally by only four or five kinds of microbes. There is, for instance, the *staphylococcus* which occurs in two varieties, the white (*Staphylococcus albus*) and the yellow (*Staphylococcus aureus*). Staphylococci, as seen through the microscope, appear in the form of tiny dots closely packed together. Another coccus frequently encountered, is the *gonococcus* which produces gonorrhea. This is a germ of slightly bean-shaped form which always occurs in pairs and therefore is also called a *diplococcus*. *Streptococci* are almost square bacteria which are arranged in the form of chains. *Colon bacilli*, finally, are short and moderately thick rod-shaped microbes which, normally, live in the large bowel of man but, under certain circumstances, develop pathogenic qualities (Fig. 10).

Wherever bacteria invade the human body, a definite course of events takes place. The area involved becomes enlarged and reddened in appearance; it feels hot to the touch and is painful; and the affected organ no longer functions well. All these phenomena, namely, swelling, redness, heat, pain, and impaired function are called the characteristic or "cardinal" signs of inflammation. They are caused by the effect of the bacteria upon the blood circulation within the infected tissues. Infection and inflammation, therefore,

Fig. 10.—Bacteria most commonly found in gynecological infections. *a*, Staphylococci; *b*, gonococci; *c*, streptococci; *d*, colon bacilli.

are one and the same thing. Furthermore, these changes are the same, whether the infection has taken place in the depth of the body (for instance, the lungs or the bowels) or on the outside. Some infections are milder than others because not all germs are equally deadly or "virulent," and because the human body, fortunately, possesses natural means of defense by which it can withstand more or less successfully the attack of microbes. If this were not the case, if our body had no power of resistance whatever, we would helplessly succumb to any infection to which we are exposed.

This brief review may suffice to introduce us to a consideration of the infections which are more commonly encountered in gynecological work.

GONORRHEA

This infection which is caused by the gonococcus (Fig. 10,*b*) is transmitted in adults exclusively in sexual intercourse. The germs are deposited at the urinary meatus or at the cervix, or, more frequently, at both locations. There they

Fig. 11.—Abscess of Bartholin's gland. (From Kelly, "Operative Gynecology," published by D. Appleton and Co.)

produce those typical changes which were mentioned above. The consequence is considerable pain in urination and inside of the vagina. They also produce a great deal of thin, greenish-yellow pus which runs out over the vulva and irritates the latter. The glands of Bartholin (see page 19)

open into the vulva, and their ducts very often become secondarily infected by the gonorrheal pus. The result would be an abscess in one or both glands (Fig. 11). Such an abscess may break open by itself or require a surgical operation. The pus which contains millions of gonococci, may also

Fig. 12.—Condylomata acuminata, or venereal warts.

reach the anus and infect the rectum giving rise to a painful inflammation of the lower part of the bowel, a so-called *proctitis.*

The purulent discharge is so irritating that it causes upon the skin wart-like elevations which are called *venereal warts* or *condylomata acuminata* (Fig. 12). These warts may in some cases become very extensive and form large masses.

From the cervix the infection may spread upward into the uterus. This is most apt to happen during menstruation or as the result of exertions or manipulations within the

vagina. Once the germs are inside the uterine cavity, they extend also into the tubes, setting up within the latter a severe inflammation, a *salpingitis*. The infected lining of the tubes produces a great deal of pus which runs out of the abdominal or fimbriated end of the tube (Fig. 13) into the pelvic cavity and naturally first infects the ovary which is closest to the tube. Here, too, an inflammation is set up, an

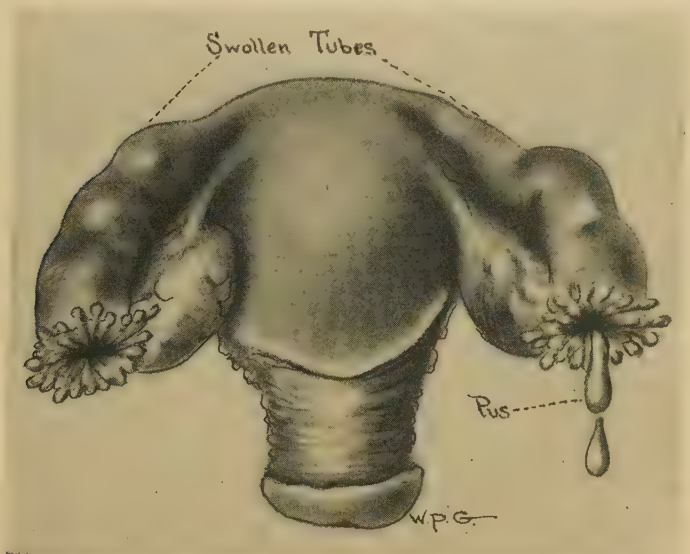

Fig. 13.—Acute purulent salpingitis. The tubes are greatly swollen, and pus is seen exuding from one of the tubal ends. (Graves.)

ovaritis or oophoritis. The infection of both organs is, as far as time is concerned, almost simultaneous so that both tube and ovary are usually involved together. We speak of it as *salpingo-oophoritis*. At the same time the pus dripping from the tube, causes an intense irritation of the lining of the pelvic cavity, a *pelvic peritonitis*. This, in turn, expresses itself by the formation of an abscess or, more often, of adhesions, that is, bands or sheets of a fibrinous substance, which envelops all the organs in the pelvic cavity and eventually seals over the open mouth of the tube. The latter is now

closed; and as pus continues to be produced by the inflamed lining and cannot escape either into the uterine or the pelvic cavity, the tube becomes distended and is transformed into an oblong or gourd-shaped sac, a *pus tube* or *pyosalpinx* (Fig. 14).

The process of extension of a gonorrheal infection from the cervix into the uterine cavity and thence through the tubes into the pelvic cavity, is spoken of as *ascending gonorrhea.* It is obvious that so intense and widespread an infection in the

Fig. 14.—Double or bilateral pus tube. On the right side the greatly distended tube is separate from the ovary which is enveloped in adhesions. On the left side tube and ovary form an indistinguishable mass which is filled with pus, a so-called "tubo-ovarian" abscess. (Graves.)

depth of the body must make a deep impression upon the entire organism, and as a matter of fact, such patients are quite sick, have high fever, and complain of very severe pain in the abdomen. Gradually the intensity of all symptoms decreases, and the acute stage gives way, within a few weeks, to the chronic, more quiescent stage.

Not very much can be said here about treatment because there is as yet no unanimity on this point among doctors. This very fact indicates that no absolutely satisfying treatment has thus far been devised. All physicians, however, are agreed that the acute stage of the infection calls for complete

rest to the exclusion of any active treatment. To the nurse this means, that the patient should be disturbed as little as possible, and that nothing should be done to stir up the infection or to promote its further spread. Such a patient should, therefore, not be catheterized for it would clearly be impossible to avoid transplanting gonococci into the bladder whereby an inflammation of the bladder, a *cystitis*, would be set up which, in turn, might extend to the ureters and kidneys. If, in exceptional cases, catheterization should be imperative, special precautions must be taken to prevent an infection of the bladder. In such a case a stronger solution of silver nitrate, than the one ordinarily used (Chapter XV) would be in order.

Painstaking cleanliness of the outer genitals is demanded in the hope of forestalling an infection of the bartholinian glands or rectum. The ordinary pitcher douches (page 236) seem to me quite inadequate. If they really wash off the vulva and not merely drench the outside of the labia, they are more apt to distribute infectious material over the endangered areas. It is far better to separate the lips widely with one hand, to wipe off the exposed mucosa *gently* with cotton sponges soaked in bichloride, and then to dry the vulva equally gently with cotton. In doing so, the nurse should protect her fingers with rubber gloves or cots, lest she infect her own eyes or nose accidentally with the highly infectious pus. The diet should be bland and free from spices, and the patient should been encouraged to drink water freely. Accumulation of feces in the rectum should be prevented, perhaps best by copious enemas, lest the congestion incident to constipation favor the ascent of gonorrhea from the cervix into the uterus. Vaginal douches are generally contra-indicated in the acute stage. During menstruation, when the upward spread of the infection is most likely to occur, an ice bag on the lower abdomen may have a restraining influence; it certaintly is of great help if the infection has already taken hold of the tubes and pelvic peritoneum.

In the chronic stage, the treatment is much less standardized as has been said before. Only a few procedures are in general use. This pertains, for instance, to the infection of the ducts of Skene. These are very small tubes on either side of the

floor of the urethra. While in the urethra itself, the infection disappears fairly quickly, the gonococci remain indefinitely in these fine tubes of Skene, and unless they are eradicated from their hiding places, they are apt to sally forth at any time and cause recurrences of the inflammation even years after the original infection. The treatment consists of the injection of a few drops of a 2 to 5 per cent solution of silver

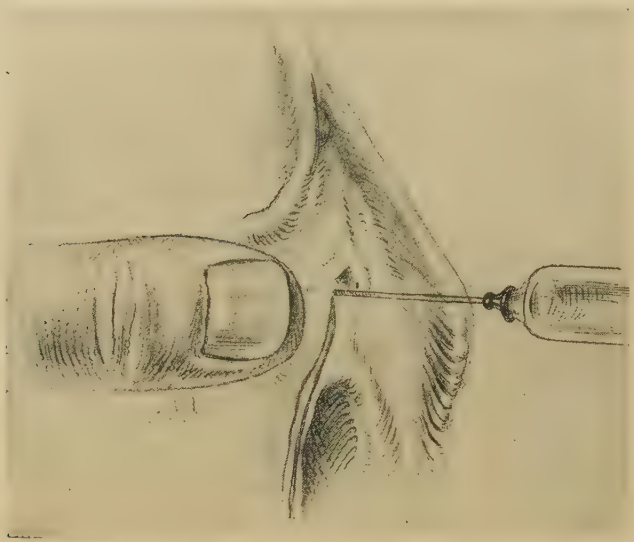

Fig. 15.—Disinfection of Skene's ducts with hypodermic syringe and blunt needle. (From Anspach, "Gynecology," published by J. B. Lippincott Co.)

nitrate which is done with an ordinary hypodermic syringe and blunted needle (Fig. 15). The nurse can blunt the sharp point of the needle by means of a nail file and smoothing the edge with sand paper. The openings of the ducts if located inside the urethra can be made visible by means of the simple and ingenious device suggested by Kelly (Fig. 16).

In the chronically infected cervix, the swollen mucous lining which produces a great deal of thick, ropy, greyish-yellow discharge, is often treated by means of electrocauterization (page 69). For the discharge itself, douches are

frequently ordered. Their value is, on the whole, very slight, and for this reason, treatment with drying powders has recently come into vogue (page 114).

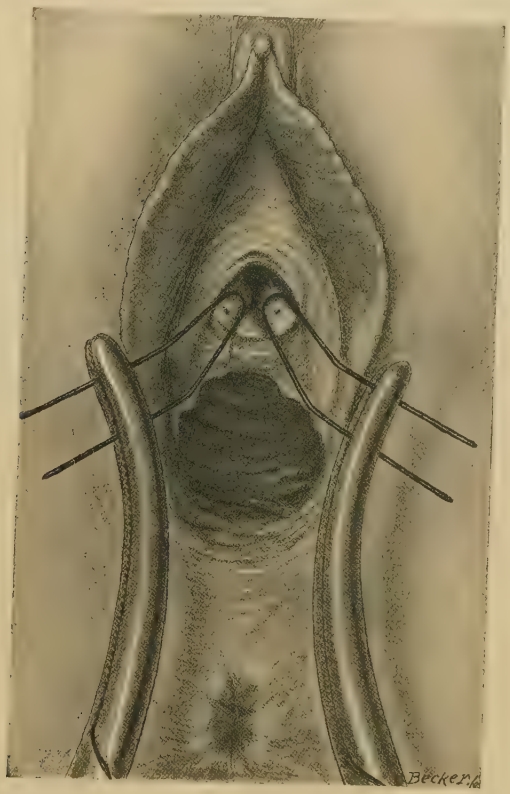

Fig. 16.—Bent hairpins grasped in artery forceps and used as a speculum to expose the orifices of Skene's ducts. (Kelly and Noble.)

As to the treatment of chronically inflamed tubes and resultant conditions, opinions are still divided. Some attack them by means of an abdominal operation; others, among them myself, prefer conservative and absorbent treatment of which more will be said in subsequent chapters.

VULVOVAGINITIS

In children there occurs not infrequently a purulent vaginal discharge which greatly irritates the skin and causes much itching and pain. One may find it in infants of only a few weeks or months of age. In about 20 per cent of the cases, this discharge is produced by lack of cleanliness, in the remaining 80 per cent it is due to a gonorrheal infection. It requires a microscopic examination to determine whether or not gonococci are present. Contrary to former beliefs, the source of infection is only rarely rape, but more often transmision through sleeping with an infected mother or sister, or still more frequently, contamination from infected bed linen, towels, sponges, bath water, toilet seats, etc. For this reason veritable epidemics have occurred in orphan asylums, boarding schools, and the like.

The prevention of this vulvovaginitis in little girls depends first and foremost on the education of the mothers as well as the managers of asylums. The nurse can set an example by scrupulous cleanliness in the handling of children. This includes the wearing of gloves, the use of individual beds, thermometers, soap, towels, bedpans, etc.

The treatment of vulvovaginitis is time-consuming and rather unsatisfactory, to judge from the multiplicity of methods and medicaments recommended. The most popular mode is that of vaginal douches containing permangamate of potassium or a silver salt such as silver nitrate, protargol, argyrol, and the like. If a watery solution shows signs of being irritating, the antiseptic may be combined with glycerine or mineral oil. The great drawback of all these instillations which are made through a thin rubber catheter, is that the medicinal substance remains in contact with the inflamed mucosa only a short time and that it has no opportunity to penetrate into the crevices of the vagina. Moreover, the treatment has to be given for many months, at least once a day; and as the results, if any, are hardly noticeable, the zeal of even the most enthusiastic nurse is apt to cool off.

More satisfactory is the treatment with an ointment containing silver nitrate or mercurochrome. This ointment is injected into the vagina through an ordinary glass syringe with a slender nozzle to which a piece of soft rubber catheter

or tubing, about three inches long, is attached (Fig. 17). The tubing is changed for each patient and boiled before and after use. It can be introduced without pain into the vagina of even a very small child, and is slowly pushed inward the entire length of the vagina. The latter, then, is very slowly filled to capacity with the medicated salve. The excess which oozes back through the hymeneal opening, is not wiped off as it is meant to cover and protect the irritated vulva and its surroundings.

The treatment is given once a day, without any additional douching. At regular intervals, after a day without treat-

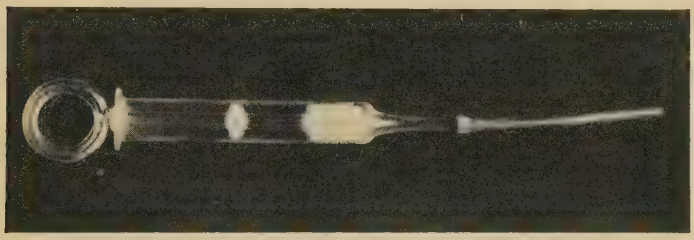

Fig. 17.—A "Triumph" syringe with a slender nozzle to which a piece of soft rubber tubing is attached, for injection of ointment in gonorrheal vulvovaginitis. It can be introduced without pain into the vagina of even a very small child.

ment, the discharge is examined microscopically by the doctor. Cure is effected, on an average, in eight weeks. The treatment is simple and painless and is usually entrusted to the nurse.

SEPTIC INFECTIONS

The bacteria encountered in this class of infections are streptococci, staphylococci, and colon bacilli. The time when infection occurs, is usually during a confinement or abortion, and the infection itself is called *childbed fever* or *sepsis*. The very severe and acute cases of childbed fever do not concern us here. They belong to the realm of obstetrics, and such patients are quite apt to die. It has been estimated conservatively that 12,000 women die yearly in the United States from this cause. A vastly greater number survives, perhaps because their natural power of resistance overcame the infec-

tion or because the infection was comparatively mild; but they become chronically invalided and require medical attention. These are the patients we encounter in gynecological work.

In attending such cases, the nurse will hear various diagnoses and technical terms which require explanation.

Subinvolution.—After childbirth the enormously enlarged uterus gradually decreases in size until it again reaches its

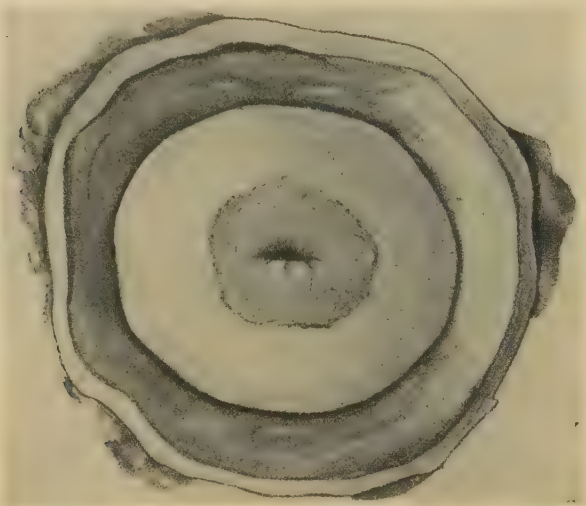

Fig. 18.—An erosion. This is caused by an extension of the inflammatory process in the cervical canal to the outer surface. (Redrawn from Berkeley and Bonney for Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

normal proportions. This process which ordinarily consumes from six to eight weeks, is called involution. If, however, there is some interference with this process of involution—the usual cause is an infection—the uterus does not regain its former small size but remains larger and harder than normal. This state is called subinvolution. Such patients complain of a sense of weight or fullness, they have profuse, prolonged, and often painful menstruations, and are not likely to have further children.

Erosion.—This is a bright red area which, viewed through a speculum (page 143) is seen to occupy the posterior lip of the cervix or surround the external os (Fig. 18). It is most often caused by a mild infection of the cervical canal during labor which has led to a chronic inflammation of the lining of that canal, a chronic *endocervicitis*. The result is an increased secretion which in turn macerates and thus softens the mucous covering around the uterine orifice.

Fig. 19.—A pelvic exudate, filling the loose space between uterus and pelvic wall. (Redrawn "from Jaschke-Pankow for Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

Pelvic Exudate.—Through fresh tears in the cervix, sustained during labor, microorganisms may gain entrance into the loose tissues by the side of the uterus and here produce a more or less extensive inflammation. As a result a cavity is formed which is filled with pus or a more gelatinous, yellowish substance called exudate. In the chronic stage in which we see such patients in the gynecological service, the pus has either been drained by means of an incision, or the exudate has partially been absorbed. There remains a hard mass in the vicinity of the uterus (Fig. 19) which gives rise to

considerable distress and calls for various forms of non-operative treatment which will be discussed in later chapters.

SYPHILIS

The infection is caused by a corkscrew-like bacillus called spirochete (Fig. 20). There are several varieties of spirochetes. The specific spirochete of syphilis, because of its appearance under the microscope, is called the pale spirochete or *Spirochaeta pallida*. The usual mode of transmission is by sexual intercourse, and the first manifestation of the disease

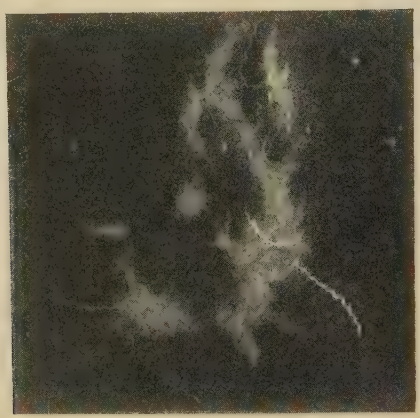

Fig. 20.—Spirochaeta pallida, the germ of syphilis.

is somewhere about the outer genitals. This takes the form of a small, apparently quite harmless pimple or sore which is called the *hard chancre* or *initial lesion* and makes its appearance about three weeks after the infection. Sometimes there are two or more such chancres present (Fig. 21). There is absolutely no pain or other symptom connected with the chancre, and if the latter happens to be hidden under the pubic hair or in the folds of the lips, the patient may never know of its existence unless it is discovered accidentally. The chancre lasts only a week or two and then disappears. This marks the passing of the so-called "first" or "primary stage" of syphilis which began when the patient became infected.

She now enters the secondary stage which lasts, on an average, three years. This stage is characterized chiefly by various manifestations upon the skin and mucous membranes. There are more or less marked eruptions of the skin, particularly of the trunk; headaches; sore throat; falling hair; pain in the bones; and, frequently, anemia and slight fever. About the vulva there appear numerous round or oblong ulcers which are raised above the surface. As a rule, they cause no discomfort except a slight thin discharge. These are called *condylomata lata* (Figs. 22–24). Sometimes these condylomata

Fig. 21.—Two hard chancres on the labia majora.

grow very luxuriantly and assume enormous proportions, as, for instance, in the case of a girl of 18 who was admitted to the Barnard Free Skin and Cancer Hospital in a desolate condition (Fig. 25). She was highly anemic and, aside from fever and pain in various parts of the body, she had a mass of condylomata lata around the vulva forming a large tumor

Fig. 22.—Condylomata lata on vulva and anus.

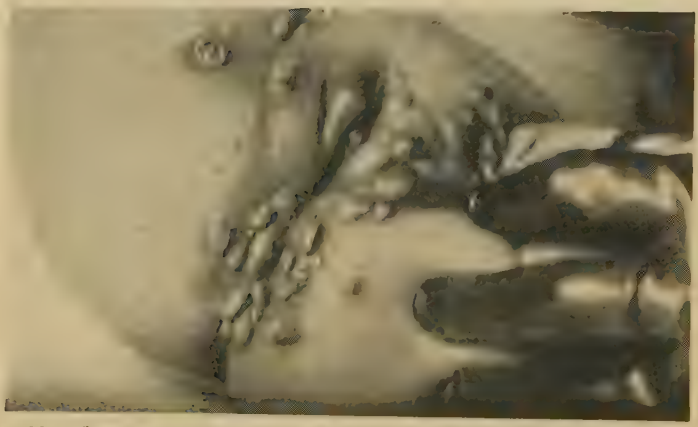

Fig. 23.—Condylomata lata on the outer genitals of a child. (From the collection of the Barnard Free Skin and Cancer Hospital.)

which made it impossible for her to be on her feet. She had to lie in bed with her legs far apart, and it took almost a year of intensive treatment before she could be dismissed as cured.

The third or tertiary stage either follows the second stage immediately or only after years of apparent freedom. In the latter case we speak of the disease as being "latent,"

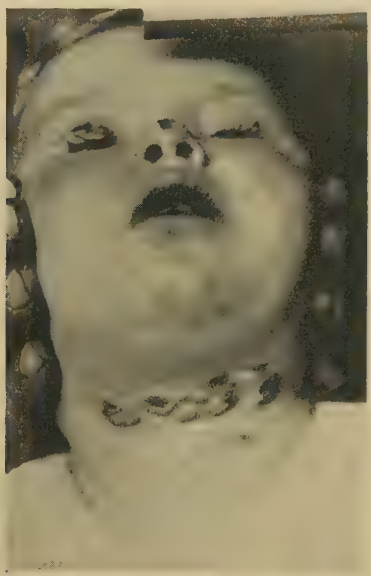

Fig. 24.—Condylomata lata on the neck of the child, shown in Fig. 23.

that is, being present without showing itself. The tertiary stage may manifest itself in every organ of the body. The heart and blood vessels and the nervous system are particularly often affected, and even the laity knows nowadays that tabes or locomotor ataxia, is the result of a syphilitic infection. In the genital region tertiary syphilis frequently gives rise to deep ulcerations or large growths which are called gumma (Fig. 26), or to enormous enlargements of the major lips, called pseudo-elephantiasis (Fig. 27).

The diagnosis of syphilis is made not only from the outer manifestations of the disease and the microscopic examination for spirochetes, but also from the chemical behavior of the blood as ascertained by a special laboratory examination which is known as the *Wassermann test.*

Fig. 25.—An enormous mass of condylomata lata of the vulva in a girl of eighteen. This overgrowth of the condylomata was stimulated by lack of personal cleanliness and absence of appropriate treatment.

During the first and second stages all syphilitic secretions are highly contagious. Infection can readily be carried to other healthy people. Hence, the nurse should take pains to keep all objects used by the patient such as toilet articles, eating utensils, bed pans, bed linen, pads, dressings, etc. separate and to disinfect or destroy them at once after use. Above all she owes it to herself to use every possible personal precaution. Many nurses have been infected while attending

syphilitic patients. She should not give douches and enemas or change dressings without wearing rubber gloves. Even a very innocent looking pimple may be a chancre, and it would be the safest policy to use gloves in every manipulation about the genital organs of any patient.

Fig. 26.—Gummatous ulceration which extends into the vagina and involves the rectum. Note the two fistulous tracts through the sphincter ani.

On the other hand she should bear in mind that most patients are innocent victims and that she must neither by word nor look intimate her knowledge of the affliction. It is the doctor's business and not the nurse's, to discuss the condition with the patient.

CHANCROID

Less frequent than either gonorrhoea or syphilis is a form of venereal ulcer about the vulva which is called chancroid or soft chancre. This is produced in sexual intercourse by infection with a bacillus, called after its discoverer the *Bacillus of Ducrey*. There are almost always several ulcers present, arranged symmetrically on opposite sides of the labia. The infection causes a severe inflammation with a great deal of

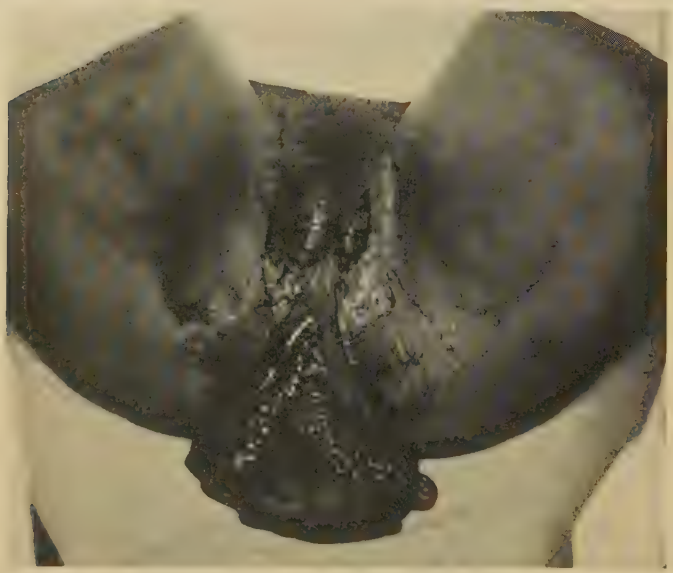

Fig. 27.—Syphilitic pseudo-elephantiasis in a negress of twenty-two.

pain, and as lack of cleanliness favors the progress of the condition, soft chancres are most often found in people who neglect personal hygiene. In contradistinction to syphilis which spreads by way of the blood stream through the entire body, the chancroid is a local disease. It is, however, at times complicated by a *bubo*, that is, a painful swelling of the glands in one or both groins which may form an abscess and break open.

QUESTIONS

1. What are pathogenic bacteria? Which of these are most frequently encountered in gynecological practice?
2. Which parts of the genitals are first infected in gonorrhea? Name the first symptoms of this infection.
3. What is ascending gonorrhea?
4. Define salpingitis and pyosalpinx.
5. What nursing care should you give a woman with acute gonorrhea?
6. What personal care should a nurse take who is attending a patient with gonorrhea?
7. What is vulvovaginitis?
8. Define subinvolution, erosion, pelvic exudate.
9. Which microbe causes syphilis? What is the first manifestation of the disease?
10. In which stage of syphilis do condylomata lata occur? Which is their favorite location?
11. What precautions should a nurse take to prevent spreading syphilitic infection to other, healthy people, including herself?
12. Why should a nurse never discuss this disease with a patient who has syphilis?

CHAPTER IV

DISPLACEMENTS

The uterus occupies the center of the pelvic cavity and is maintained in its position chiefly by three sets of cords and sheets on either side, called ligaments, which lead to the walls of the pelvis. These are the round, broad, and sacro-uterine ligaments, respectively. Their attachments to the uterus appear in Fig. 28. The round ligaments insert on the anterior

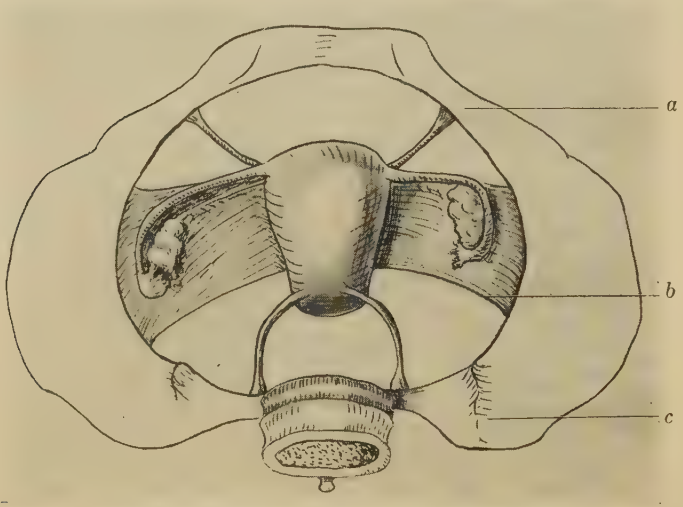

Fig. 28.—The uterine ligaments (diagrammatic). *a*, Round ligaments; *b*, broad ligaments; *c*, sacro-uterine ligaments.

surface near the horns or rounded edges of the fundus. The broad ligaments, as the name implies, insert along the entire side edges of the uterus. The sacro-uterine ligaments are attached low down on the back of the uterine body. Beneath,

the uterus is supported by a thick mass of muscles which close the lower aperture of the pelvis and form the *pelvic floor* (Fig. 29). The most important of these is the *levator ani muscle.*

The uterus lies in a gentle curve in such a way that the cervix "points" backward toward the rectum and sacral bone, while the body of the uterus leans forward and rests upon the

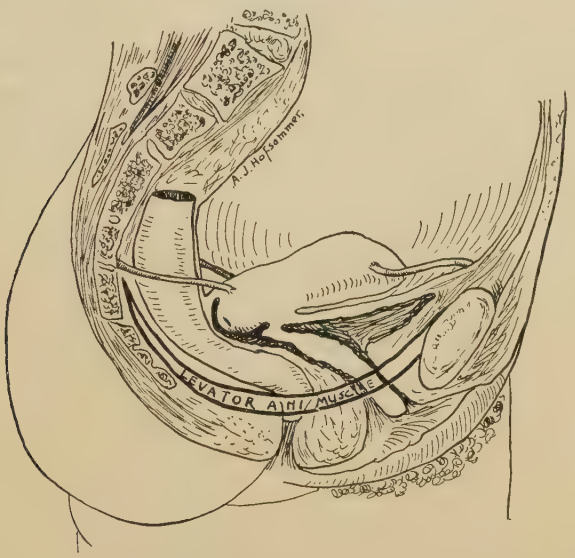

Fig. 29.—Side view of the pelvic organs, showing the round and sacro-uterine ligaments, and the pelvic floor. Note that all the structures in the pelvis rest upon the levator ani as upon a firm foundation.

top of the bladder (Fig. 3). This is its normal position which is called *anteflexion.*

The uterus does, however, not stay in this position immovably. When, for instance, the bladder fills with urine, the body of the uterus is lifted upward and backward, and when the rectum becomes distended with feces, the entire uterus is pushed forward. Likewise, by breathing or strong exertions the organ is pushed a trifle downward, and in fact, every change in position produces a corresponding though slight effect on the position of the uterus.

All these excursions of the uterus are limited and merely temporary, and the uterus always returns to its normal anteflexion. Only if the uterus remains *permanently* in any other position, do we speak of displacements. There are quite a number and degrees of such displacements. Those that the nurse is most often to hear of, are retroflexion and prolapse.

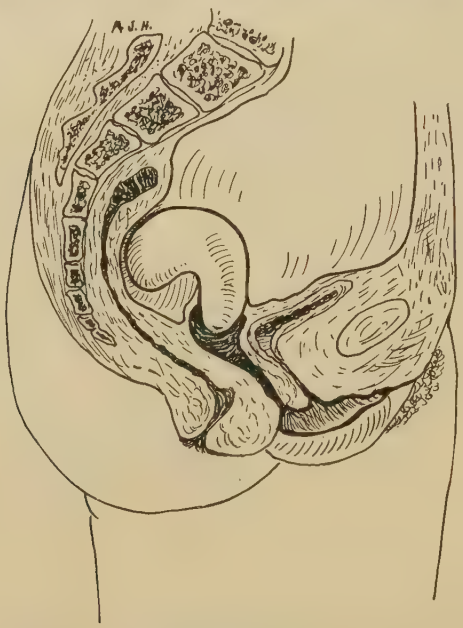

Fig. 30.—Retroflexion of the uterus. This position of the uterus is exactly the reverse of the normal anteflexion.

In *retroflexion*, the position of the uterus is exactly the reverse of the normal anteflexion, that is, the cervix "points" into the axis of the vagina or toward the bladder, while the body leans toward the rectum (Fig. 30). In a certain number of persons this position of the uterus exists at birth. Such a "congenital" retroflexion, while abnormal, causes no distress and requires no treatment, just as there are people born with their heart in the *right* side of the chest who have no discomfort from this displacement. In the great majority of cases,

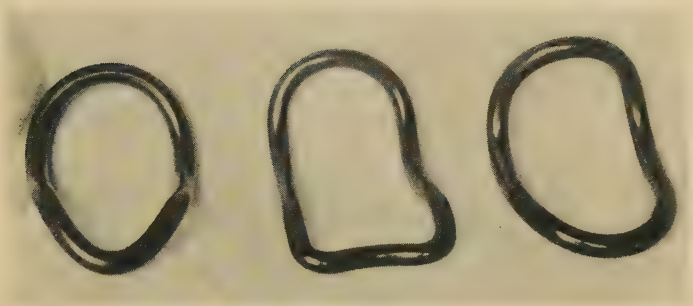

Fig. 31.—Suitable types of pessaries. The term "ring" dates from the time when *all* pessaries were round. The round form is no longer considered as practical as the ones shown in the picture.

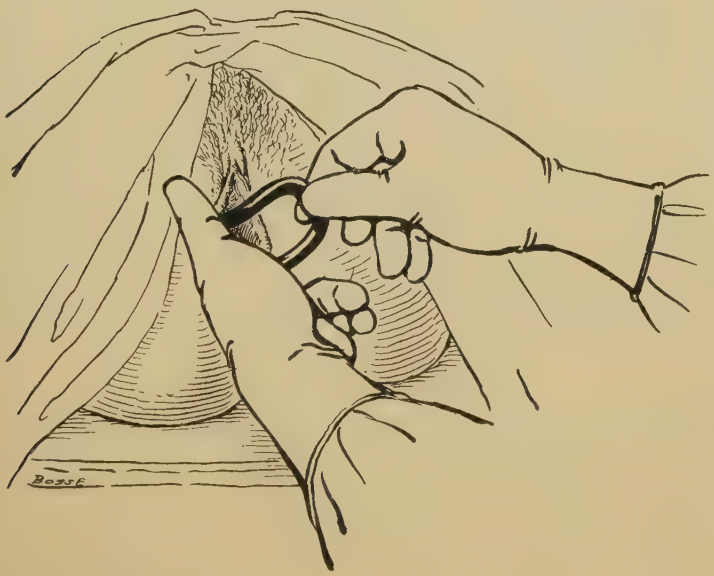

Fig. 32.—Introduction of pessary. First step. (Bandler.)

however, retroflexion is acquired, usually after confinement; and in these there are sooner or later symptoms which call for correction of the displacement.

In the simpler cases treatment with "rings" or "pessaries" may be sufficient. Pessaries are appliances of polished hard rubber (Fig. 31) which are introduced by the physician in such a way that the posterior bar lies behind the cervix while the anterior bar stems itself against the symphysis immediately behind the vaginal entrance (Fig. 32–34). The physician

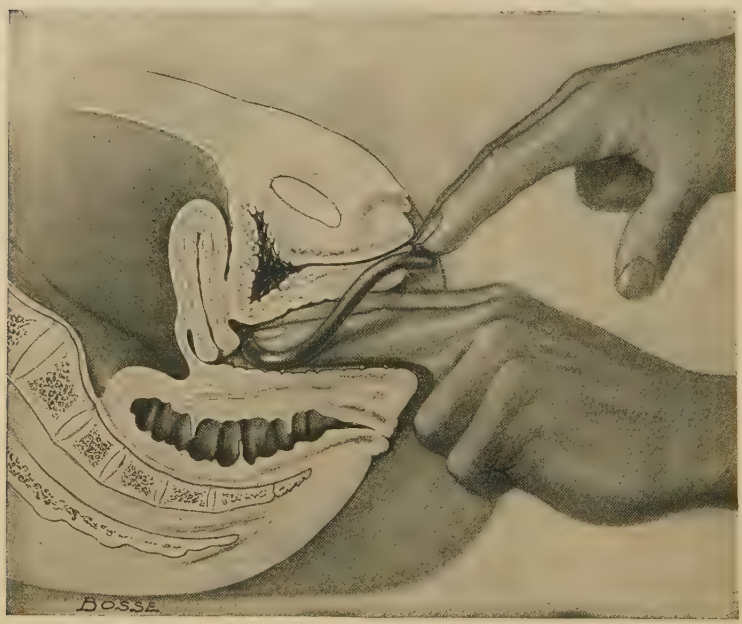

Fig. 33.—Introduction of pessary. Second step. (Bandler.)

must have quite a collection of pessaries in various shapes and sizes on hand from which to choose one that can be worn by the patient without giving discomfort. If she be at all conscious of the pessary, a smaller size or different shape must be selected. Contrary to popular belief, such a pessary in no way interferes with marital relations. At stated intervals, usually after menstruations, the pessary is removed by the

physician and replaced, after having been cleansed. This last procedure concerns the nurse. She has to scrub the pessary with soap and cold water (hot water would soften the pessary and destroy its shape!) and notice whether the surface is smooth and shining or dull and rough. In the latter case,

Fig. 34.—The pessary in place. Note that the posterior end of the pessary raises the cervix whereby the uterine body is tilted forward. The anterior end lies behind the symphysis. The fact that she can touch it there with her fingers, makes many a patient believe erroneously that the ring has "slipped." (Bandler.)

the pessary would irritate the vaginal mucous membrane and cause erosions and ulcerations. Personally, I prefer pessaries made of glass or porcelain as these can be cleansed by boiling and always retain their smooth surface (Fig. 35).

The patient, too, has to take precautions to keep the pessary clean and prevent irritation. She should take a douche of two quarts of warm (not hot) water (100 to 105 F.) in which a tablespoonful of baking soda has been dissolved.

Fig. 35.—Pessaries of glass and porcelain. The obvious advantage is permanent smoothness and perfect sterilization in boiling water. *They cannot break inside of the vagina.*

Fig. 36.—Complete prolapse of the uterus. (From Anspach, "Gynecology," published by J. B. Lippincott Co.)

These douches are taken once daily or every other day, preferably on retiring, and always in recumbent position.

There are many cases in which for one reason or another pessaries can not be used. In these, the displacement of the uterus must be corrected by means of a surgical operation. A very large number of operative procedures for the cure of

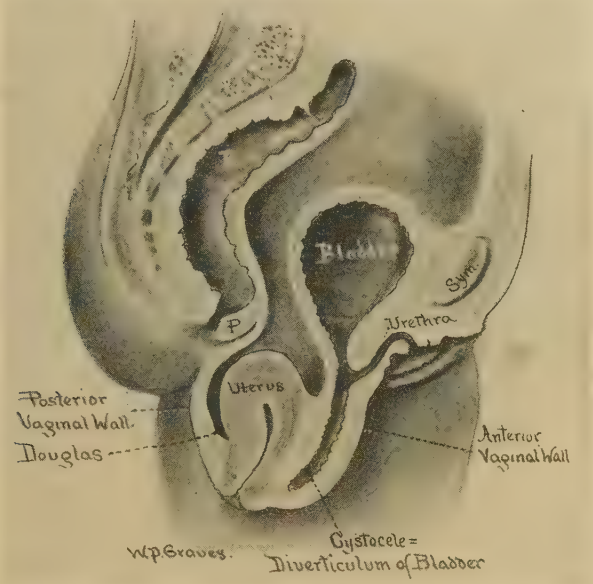

Fig. 37.—Complete prolapse of the uterus, side view. Note how easily some urine may remain in the lowermost pouch of the bladder even after voiding. (Graves.)

retroflexion has been devised. They go under the name of "shortening of the round ligaments" because the slack in these ligaments is taken up in some way whereby the body of the uterus is pulled forward toward the bladder.

If the firm support of the pelvic floor becomes deficient either by overstretching or tearing of the levator ani muscle during childbirth, the uterus sinks downward. This downward displacement is called *prolapse*. We distinguish several degrees of prolapse according to the extent to which the uterus

has moved below its normal place in the middle of the pelvis. If it is only moderately below the normal level, we speak of *descent;* if the cervix is at the vaginal entrance or appears within the vulva, we designate this an *incomplete prolapse;* and if the entire uterus is outside of the vagina, we have to deal with a *complete prolapse* or *procidentia* (Fig. 36). In this last stage, there is a mass, sometimes as big as a fist, which hangs outside and is formed by the vagina which has been carried along by the prolapsing uterus and rolled outward. At the lower pole of this mass is the cervix which, in some cases, is very large and thick and, in others, can be recognized only by the slit of the external os. Anteriorly, as Fig. 37 shows, the

Fig. 38.—Pessaries used in prolapse of the uterus.

bladder has also prolapsed, and posteriorly the rectum forms a deep pouch behind the vaginal wall. The protrusion of the bladder is called *cystocele* and that of the rectum *rectocele.* It is obvious that such a dislocation must greatly interfere with the function of these two organs. Many such patients can not urinate unless they push the protruding parts inward; and defecation is hampered in a similar manner. It is also clear that the patients are disturbed in walking, and that the exposed vagina is rubbed and irritated by the clothing so that not infrequently large raw, infected, or bleeding areas, so-called "decubitus ulcers" are seen in various parts of the vagina. The condition is usually found in elderly women, but it may occur in younger or middleaged persons who had suffered from neglected lacerations in childbirth and were forced to work too hard afterward.

The treatment at any stage of prolapse is surgical unless the patient is too old or too feeble to stand the operation. If that be the case, an attempt may be made to hold the prolapsed parts inward by specially constructed pessaries (Fig. 38) which are quite different from those used in retroflexion; or if these fail, the ingenuity of doctor or nurse may have to devise means with rubber balls or cotton tampons to give the patient at least temporary comfort. Whether operative or other treatment is planned, the sores of the vagina must be cured. This is accomplished by touching the ulcers with a 2 to 5 per cent solution of silver nitrate. The prolapsed organs are then pushed back into the pelvic cavity, and the patient is kept in bed, with the foot end of the bed slightly elevated. The nurse gives an astringent douche (page 184) once a day and tries to prevent the patient from straining at stool by means of small enemas. Under this management, the ulcerations, as a rule, heal within a week or ten days.

QUESTIONS

1. Where is the uterus located in the pelvic cavity, and by what means is it maintained in its place?
2. What is the normal position of the uterus, and what is it called?
3. What is retroflexion?
4. What are pessaries? What is their purpose? How are they kept clean?
5. Define descent, prolapse, procidentia, cystocele, rectocele.
6. What is the most common cause of the conditions enumerated in the preceding question?

CHAPTER V

INJURIES

The female genital organs are peculiarly exposed to injuries of all kinds even under perfectly normal conditions. At the first sexual intercourse the hymen is torn, and the accompanying bleeding is sometimes quite abundant. At every ovulation, the Graafian follicle must break before the egg can escape; and the surface of the ovaries are covered with numerous little scars which bear testimony to the physiologic injury which has taken place. At every menstruation, a part of the uterine lining is torn off and cast out. Childbirth, no matter how normal, always leaves traces of slight injuries behind. The external os, for instance, which originally is round, is, after confinement, transformed into a slit because of small tears at either angle. There are, further, slight breaks in the vaginal mucous membrane even after the most normal labor; and the hymen is torn in many places, the remnants forming small excrescences, the so-called "carunculae myrtiformes" (Fig. 2, *e*). These examples may suffice to show that woman, in her normal functions, is much more liable to injury than man. We are here, however, concerned only with those more marked injuries of the genital organs which the nurse may observe in the care of gynecological patients. These injuries comprise, in the main, birth lacerations and fistulae.

LACERATIONS

Lacerations may occur both in spontaneous and instrumental deliveries. They are divided into cervical and perineal tears.

Cervical Lacerations.—If the cervix is torn, the rent may be on one side only or on both sides. In either event, the original cone-shaped configuration of the cervix (Fig. 39) is destroyed, and two lips, the *anterior* and the *posterior*, are now clearly discernible in a speculum. These lips may become quite

thick and rolled outward. This is called *eversion* (Fig. 40). Sometimes we find tears not only at the angles of the externol os but also anteriorly or posteriorly. The outline of the os thereby become quite irregular when the tears have healed

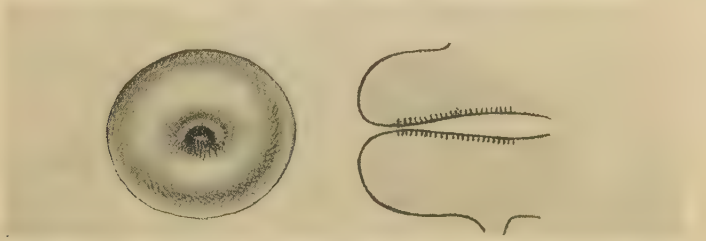

Fig. 39.—Cervix of a woman who has not borne a child. The cervix is cone-shaped, the external os round, and the cervica canal closed. (From Anspach, "Gynecology," published by J. B. Lippincott Co.)

by scar formation. We then speak of a *stellate* tear (Fig. 41).

Cervical tears may give rise to a number of symptoms, the most prominent being an obstinate, thick, and often irritating discharge. It is also claimed that they may be the starting

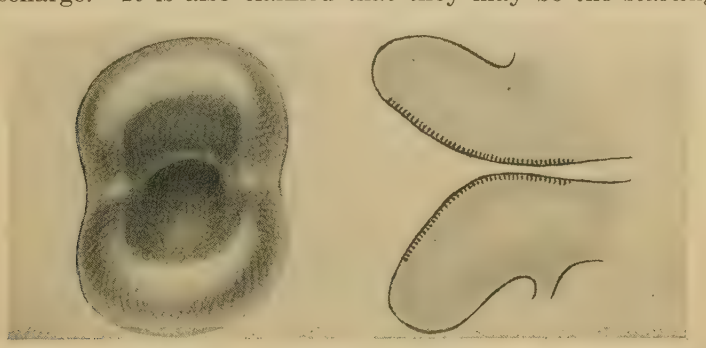

Fig. 40.—Cervix with deep bilateral tear. There are now two distinct "lips" of the cervix which are everted. The cervical canal is no longer closed, and the exposed mucosa is open to bacterial invasion and infection. (From Anspach, "Gynecology," published by J. B. Lippincott Co.)

point of cancer of the cervix. At any rate, they require treatment in the majority of cases. If the tears are not very deep, *electrocauterization* has of late become a popular mode of treatment. In this method, a thin blade such as the nose

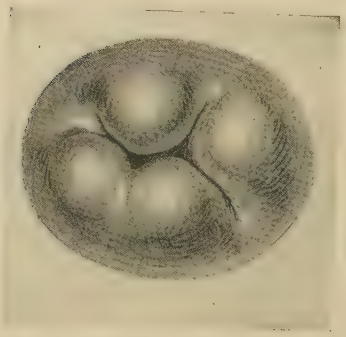

Fig. 41.—Stellate tear of cervix. (From Anspach, "Gynecology," published by J. B. Lippincott Co.)

Fig. 42.—Electrocauterization of cervix for erosion. 1, Deep lines have been burned with the thin blade of the electrocautery; 2, these burns in process of healing, two weeks later; 3, the lips have rolled inward. Complete healing in 8 weeks. (Matthews, Jour. of Amer. Med. Assoc., 1926, Vol. 87.)

and throat specialists use for operations in the nose, is heated to a cherry red by electricity and a few deep lines are burned through the exposed inner aspect of the lips (Fig. 42). After these cuts have healed, the scars contract and roll the everted lips inward, thereby restoring the normal aspect of the cervical lips.

For deeper tears, however, a surgical operation is required. The operation by which the edges of the tears are sewed up, is called *trachelorrhaphy*. This used to be a very popular

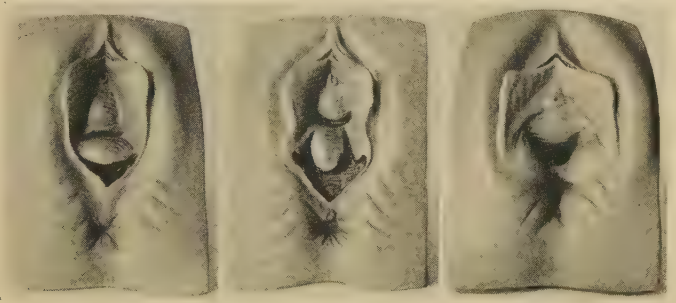

Fig. 43. Fig. 44. Fig. 45.

Fig. 43.—First degree tear.
Fig. 44.—Second degree tear.
Fig. 45.—Third degree or complete tear.

method but is now largely abandoned in favor of the so-called "*amputation of the cervix*" by which all the diseased tissue is removed. Various modes of amputation are in use and are called after the men who have designed a special technic, the Schroeder, Bonney, and Sturmdorf method, respectively.

Perineal lacerations are divided into first, second, and third degree tears according to their extent. A first degree tear (Fig. 43) is very superficial and affects little more than the mucous membrane and skin about the posterior circumference of the vaginal entrance. It hardly requires any attention, except immediately after labor when it is quickly closed with a few stitches.

The second degree tear is one which extends more or less deeply through the skin and muscles of the perineum as far down as the sphincter ani (Fig. 44). As a rule, the deep muscles of the pelvic floor are also affected. In this condition,

the vulva gapes because the perineal body, that thick, wedge-shaped mass of muscular tissue which acts as a buffer between vagina and rectum, is wholly or in part absent; and when the patient strains as if at stool, the vaginal walls can be seen protruding. If of long standing, such a tear will give rise to the conditions described in the previous chapter, namely, cystocele and rectocele, and in severe cases to prolapse of the uterus. The only logical treatment is surgical repair. The operation by which the relaxed anterior vaginal wall is restored and the cystocele cured, is called *anterior colporrhaphy;* and the repair of the second degree tear itself is termed *perineorrhaphy.*

A third degree or "total" tear is a very distressing condition (Fig. 45). It extends through the sphincter muscle and into the rectum. The consequence is that the patient has no control over her bowel action; and the gases or stools which escape without her knowledge, render her social life impossible. The operation for the relief of this condition is called *repair of total tear;* and while it is by no means a serious operation, the results are not always satisfactory. The main reason for the frequent failures is the fact that the operative field can not be rendered surgically clean and that infection interferes too often with the process of healing. Careful attention on the part of the nurse, however, may contribute a great deal toward operative success. Detailed instructions can not be given because there is no unanimity as to the best management of such cases. In general, it may be said that patients of this sort should be prepared by receiving castor oil or other laxatives for several days and daily cleansing enemas. The food should be liquid (fruit juices, clear soups, etc.) but without milk. The region about the anus should be thoroughly washed with an abundance of soap, preferably in a shower bath, several times a day, for a day or two preceding the operation. After the operation, some surgeons permit the patient to move her bowels within a very few days, others wait a considerably longer time. It seems more logical not to disturb the fresh wound for at least one week. My personal preference is to keep the bowels locked for 7 to 9 days by means of paregoric, a teaspoonful two or three times a day, to give the patient only liquids,

except milk, and to avoid insertion into the rectum of a catheter or colon tube. After nine days, at the latest, a tablespoonful of mineral oil is given three times a day. The next morning, a fairly thin rubber catheter is inserted cautiously into the rectum under guidance of the eye, in such a way that, with the patient lying on her side, the catheter is pushed inward a finger's length *along the posterior wall* of the rectum and away from the line of sutures. Six ounces of warm mineral oil are injected, and the catheter withdrawn. The patient now takes two tablespoonfuls of castor oil, and after the first bowel action, she receives regular diet and the usual post-operative care.

FISTULAE

Fistulae are abnormal openings into a hollow organ. The most common fistulae in the realm of gynecology are vesicovaginal and rectovaginal fistulae, that is, as the name implies, abnormal communications between the vagina and the bladder and rectum, respectively (Fig. 46). The usual causes of such fistulae are injuries in childbirth or during operations, Other causes are cancer of the uterus or vagina which, in its extension, may break into the adjoining organs; and, in the case of rectovaginal fistulae, syphilis. The deplorable condition of the patients who are never dry from urine or who expel gas or stool through the vagina, can readily be imagined. It happens now and then that such a fistula closes by itself, but in the great majority of cases an operation which may be extremely difficult, is required. The very important part which the nurse may contribute toward the success of the closure of a vesicovaginal fistula, is described on page 165.

The history of this operation is very interesting. In former years, before obstetrics had been developed sufficiently, women were at times left in labor for many days. The result was that the soft tissues of the vagina were often so injured by the long lasting pressure of the child's head that they sloughed out with the formation of vesicovaginal fistulae. This complication was wholly incurable until, in 1845, Dr. Marion Sims, a simple practitioner in Montgomery, Alabama, hit upon the idea of placing his patients in a peculiar position on the side, which to this day bears the name of the Sims

position (Fig. 82 on page 145) and of introducing into the vagina the bent handle of a pewter spoon with which he pulled back the perineum. This exposed the anterior vaginal wall, and

Fig. 46.—*a*, Vesicovaginal and *b*, rectovaginal fistula.

it was then for the first time that a fistula could actually be seen and that the edges of the opening could be drawn together. In spite of many failures, Sims persisted in his efforts and

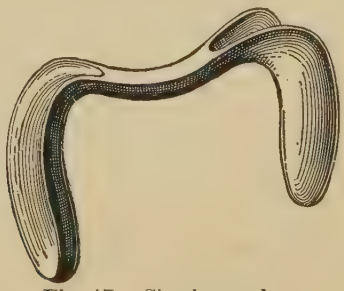

Fig. 47.—Sims' speculum.

finally succeeded in closing such fistulae in numerous cases. The pewter spoon was gradually replaced by a special instrument which is still in use and is known as the Sims speculum (Fig. 47).

QUESTIONS

1. What are cervical lacerations, and when do they occur?
2. Define trachelorrhaphy and amputation of cervix.
3. What are the degrees of perineal lacerations? What is a total tear?
4. Describe the care of a patient with total tear before and after operation.
5. What is a vesicovaginal fistula? Name two of its more common causes.
6. Define rectovaginal fistula. Name one of its causes.

CHAPTER VI

TUMORS

A tumor or newgrowth is an abnormal mass of tissue which may develop in any part of the body. It is not produced by an infection or inflammation; in fact, we know nothing whatever about its cause or causes. The word "tumor" bears no relation to size. A very small wart on the hand and a big lump of fatty tissue, let us say, on the hip, weighing many pounds—are both tumors. A tumor has no function to fulfill. It may be harmless or it may be dangerous; in any case, the body cannot derive any benefit from its presence.

Those tumors that grow more or less rapidly and without any limitation, and in the process of growth destroy other, normal tissues and also spread into the rest of the body and form secondary growths, so-called "metastases," such tumors are called *malignant* as they invariably lead to death. Tumors, on the other hand, which grow more slowly and sooner or later reach the end of their growth, are termed *benign* because they do not directly endanger life.

Some tumors are, at first, benign but at one stage or another of their development, exhibit a marked change in their character; that is to say, they suddenly grow more rapidly and display destructive qualities; they are undergoing *malignant degeneration.*

In no part of the body are tumors quite so frequently encountered as in the female genitals, and the nurse will have ample opportunity to attend patients with newgrowths belonging to one or the other of the three categories mentioned.

The chief representative of benign tumors is the fibroid, of malignant growths is cancer; while certain forms of ovarian tumors represent malignant degeneration in originally benign growths.

FIBROIDS

Fibroids occur most commonly in the uterus. They are hard in consistency and usually round in shape, and vary in size from that of a hazelnut to one of a child's and even a man's head. Their weight increases with their size; the largest fibroid on record weighed 140 pounds. They are composed for the most part of fibrous tissue (hence the name *fibroids* or *fibromas*), and when cut open, the surface is usually white like

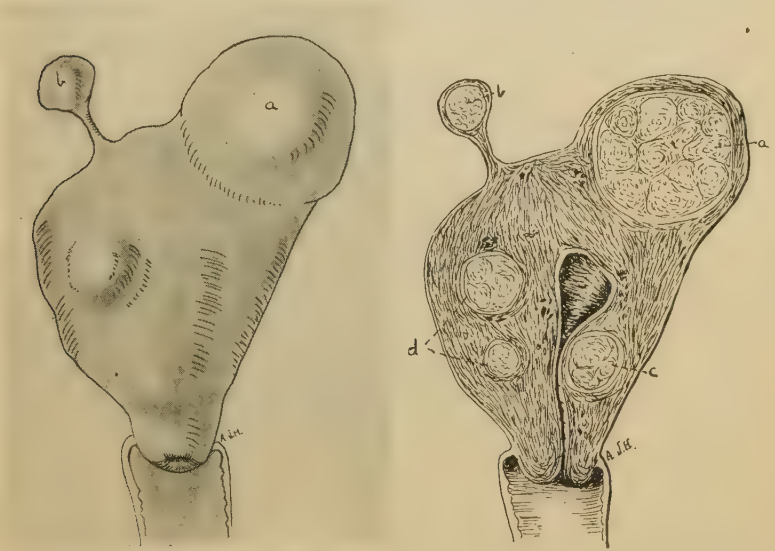

Fig. 48.—Multiple fibroids of the uterus. *a*, subserous; *b*, pedunculated. In the specimen cut open, a submucous fibroid is seen at *c*, and several interstitial ones at *d*.

that of a tendon. There may be only one fibroid, but more often there are several or even many such tumors present; we then speak of "multiple fibroids." One out of every five women has one or more fibroids, and it is claimed that among colored women the frequency of fibroids is even greater.

We distinguish fibroids according to their location (Fig. 48). Those which are beneath the covering of the uterus, are called *subserous;* they may bulge beyond the outer surface of the uterus, thus producing an irregular and nodular outline.

Sometimes they may grow altogether out of the uterus and remain connected with the latter only by a stem or stalk, a so-called "pedicle;" these are *pedunculated* fibroids.

Those fibroids which lie close to the inner or mucous lining of the uterus and protrude more or less into the uterine cavity, are called *submucous*. If located within the uterine wall itself and about equally far from the outer and inner surfaces of the uterus, they are termed "*intramural*" or "*interstitial*."

The last named kind produces little if any discomfort. Neither do small subserous fibroids, even if multiple, give rise,

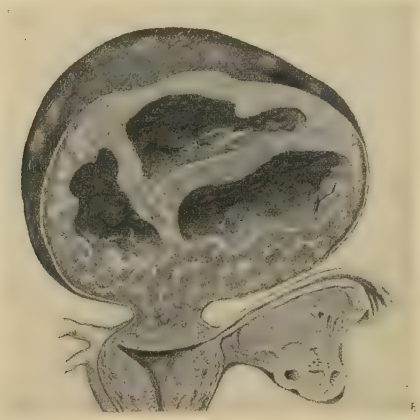

Fig. 49.—Cystic degeneration of a fibroid. (From Dudley's "Gynecology" published by Lea and Febiger.)

as a rule, to symptoms. If, however, they attain considerable size, the patient becomes conscious of a sense of weight or fulness in the abdomen. She is alarmed if she happens to feel a hard "lump;" and if the fibroids are large enough to press on bladder and rectum, she has difficulties in urination and defecation. Tumors extending beyond the navel may also interfere with the function of the stomach and lungs. The menstrual flow is usually prolonged and increased and, particularly in the case of submucous fibroids, becomes excessive, clotted, and painful. Such a profuse and protracted menstruation which is called menorrhagia, may persist for two or three weeks without interruption and often lead to a high degree of

anemia. In spite of this, the patients do not always lose in weight; on the contrary, many women with fibroids are decidedly obese.

In a certain rather small percentage of the cases, fibroids, when cut open, show an unusual appearance which we call "degeneration." This may be deep red or yellow (fatty) or hyaline, (that is, dead white or paraffin-like) or cystic. In the latter variety, small and larger cavities appear within the tumor which are filled with a watery fluid (Fig. 49). Finally, fibroids may undergo malignant changes. This, however, is much less frequent than is generally assumed. Thus, even these originally benign tumors may occasionally assume a very sinister aspect.

Not every fibroid needs to be treated. When treatment is required, it is largely surgical. If the uterus is removed together with the fibroids, the operation is called *hysterectomy*. If only the fibroid or fibroids are shelled out, we speak of *enucleation* of fibroids or *myomectomy* (myoma being another name for fibroid). More recently, *x*-rays and radium have been employed with success. Which of these methods is applicable in a given patient, depends on the nature of the case and the judgment of the attending physician.

CANCER

Cancer appears on the external genitals, in particular the major lips, in the form of a small sore which rapidly changes into a hard and raised ulceration (Fig. 50) and, despite all ordinary treatment, spreads both into neighboring tissues and into the depth. There is considerable oozing of blood and pus from the irregular and angry looking surface, and a good deal of pain almost from the start. In this last-named feature external cancer differs from cancer of the uterus where pain is always a *late* symptom.

The treatment of cancer of the vulva is either surgical or by means of *x*-rays or radium according to the state of the disease.

The most frequent seat of cancer of the genital tract is in the uterus. Here it attacks either the cervix or the uterine body. In the cervix it usually forms a large, shaggy mass which pro-

jects into the vagina, the so-called "cauliflower" growth (Fig. 51).

Later, the tumor breaks down in the center thus giving rise to a deep, crater-like cavity. Simultaneously the cancer grows into neighboring tissues and involves the walls of both

Fig. 50.—Early cancer of the vulva. (Graves.)

bladder and rectum. It may finally break through into these organs and thereby produce communicating channels between them and the vagina, in other words, urinary and intestinal fistulae (Fig. 52).

In the uterine body the cancer establishes itself somewhere in the lining (Fig. 53) and gradually implicates the rest of the endometrium. The uterus itself becomes, as a rule, enlarged and boggy.

The first and foremost symptom of cancer is bleeding which occurs at irregular intervals and quite independent of the menstruation. The amount may be scanty and more in the nature of a bloody discharge; again, it may be an alarming hemorrhage; or it may be a watery flow and more or less deeply tinged with blood. The bleeding may last only a few hours or it may persist for days and even weeks. Very soon the blood or, in the few free intervals, a dirty greyish-yellow discharge emits

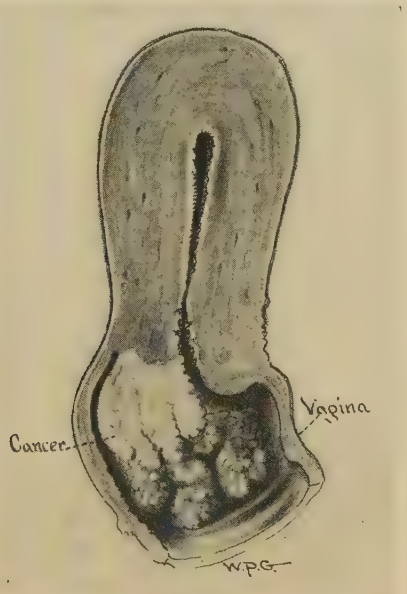

Fig. 51.—"Cauliflower" cancer of the cervix. (Graves.)

a foul and excessively offensive odor; and if fistulous openings into bladder or rectum have occurred, the stench from escaping urine or stools makes existence almost unbearable both to the patient and her surroundings.

In most instances the disease very soon puts its mark upon the unfortunate patient. She loses in weight and strength; her appetite wanes, and the pallor of the complexion testifies to the continuous losses of blood and body fluids. But it is not

until the cancer has taken a firm hold and extended beyond the uterus into adjoining structures and nerve tracts that pain occurs, unceasing pain which, at first dull, soon becomes ago-

Fig. 52.—Advanced cancer of the cervix. The newgrowth has spread into the uterus and extends to bladder and rectum; in the former it has led to a vesicovaginal fistula. (Cullen, "Cancer of the Uterus.")

nizing and destroys rest at night as it tortures the victim by day. The fate of the patient with uterine cancer is truly pitiful, and the lingering death which looms as the inevitable end, comes to her as a release from intense suffering.

Such is the course of the disease if the patient has neglected to seek medical aid in time. To the woman who has applied for competent help at the first danger signal of bleeding, a

much more hopeful forecast may be given. In this question the nurse plays so important a part that a special chapter must be devoted to further details of the problem of cancer (see Chapter XII).

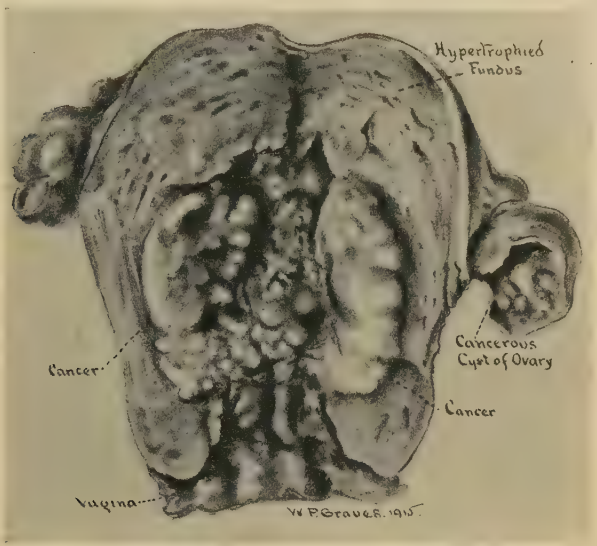

Fig. 53.—Cancer of the body of the uterus. This tumor has produced a metastasis in one ovary. (Graves.)

OVARIAN TUMORS

The ovaries are rather frequently the seat of new growths of different varieties. Most often do these new growths represent cystic tumors, that is, sacs whose walls are formed by ovarian tissue and whose contents are fluid.* These cysts may grow from very small size to enormous dimensions (Fig. 54). Their bulk alone may cause serious distress. Besides, in more than 50 per cent of the cases malignant changes take

* These true ovarian cysts must not be confused with cystic ovaries. In the latter condition, the outside of the ovaries becomes thickened from congestion or inflammation which prevents the Graafian follicles (page 27) from bursting. This leads to retention of these follicles and formation of one or more cavities within the ovaries. They rarely attain any considerable size.

place which add a new element of danger. Not infrequently ovarian cysts become "twisted," that is, the stalk or pedicle which connects them with the uterus, turns and twirls around until the blood supply in the pedicle is cut off (Fig. 55).

Fig. 54.—Large ovarian cyst in a negress. Death without operation. (From Kelly, "Operative Gynecology," published by D. Appleton and Co.)

A sudden and marked increase in the size of the cyst is the immediate result together with most severe abdominal pain and, often, collapse of the patient.

The nurse will have occasion to assist at an operation for "dermoid" cyst. This is a tumor of moderate size which, externally, looks like any other ovarian cyst. Opened, however, it presents an entirely different and altogether baffling

Fig. 55.—Double ovarian cyst showing twisting of pedicle on one side. (Graves.)

Fig. 56.—Dermoid cyst. (From Findley, "Diseases of Women," published by Lea and Febiger.)

appearance (Fig. 56). It is filled with a yellowish, thick, greasy, odorless fluid of the consistency of thick pea soup. Within these sticky, fatty contents there appears matted hair, usually reddish in color, and either attached to the wall or lying free, there are pieces of jaw bone often with well formed teeth, ribs, fragments of eyes, brain tissue, cartilage, and numerous other more or less well defined organs and structures. The cause of the production of these interesting formations is unknown.

The treatment of all kinds of ovarian cysts is operative removal as soon as the diagnosis is made.

The operation is called *ovariotomy*. The story of the first ovariotomy ever performed is very interesting. While nowadays ovarian cysts of thirty or more pounds are quite rare, they were rather common a hundred years ago, and cases were reported when the weight exceeded 150 pounds. The suffering of the patients was terrific, and their outlook was a lingering death. No one had ever dared to open the abdominal cavity and take out the cyst. The only treatment then practiced was tapping of the cyst through the abdominal walls. Not only was this crude method painful, as morphine or anesthesia were still unknown, but, no matter how many dozen times the tapping was repeated, the fluid would always form again; or else, in the absence of surgical cleanliness as yet undiscovered, infection and death from blood poisoning would take place.

Such was the state of affairs when, in December 1809, Dr. Ephraim McDowell, a backwoods practitioner in the small town of Danville, Kentucky, was asked to see a Mrs. Jane Crawford who, for several months, had thought herself pregnant. She was afflicted with pains similar to labor pains, from which she could find no relief. So strong was the presumption of her being in the last stage of pregnancy that two physicians who were consulted about the case, requested McDowell's aid in delivering her. Upon examination, however, McDowell came to the conclusion that he had to deal with an ovarian cyst. In informing the patient of her dangerous condition, he told her that he had long been thinking of the possibility of removing ovarian cysts by operation, though neither he nor anybody else had ever done it, and he proposed to perform the experiment if she would come to Danville,

a distance of sixty miles from her place of residence. There were no trails nor wagon roads in those days, but the stout-hearted woman, driven to desperation by her unremitting pain, made the journey in the space of a few days on horseback, resting the tumor on the horn of the saddle. When she arrived, the abdominal walls were bruised and bleeding, but this was not allowed to interfere with the operation which was performed with but one assistant present. She was placed on a kitchen table on her back, the clothes were pulled up, and an incision was made. The cyst weighed $22\frac{1}{2}$ pounds. "As soon as the external opening was made," said Mc Dowell in his first publication, "the intestines rushed out upon the table, and so completely was the abdomen filled by the tumor, that they could not be replaced during the operation which was terminated in about twenty-five minutes. We then turned her upon her left side so as to permit the blood to escape, after which we closed the external opening with the interrupted suture." Soon after the operation, Mc Dowell was called to a distant part of the state, and when he came back five days later, he found her, much to his astonishment, engaged in making up her bed. "I gave her particular caution for the future, and in twenty-five days she returned home on horseback in good health which she continues to enjoy"—with these words he closed his original report.

From a later note we learn that Mrs. Crawford lived for thirty years after the operation, dying in the seventy-ninth year of her life. All glory to the fearless woman who submitted to this experiment in the face of such terrible suffering and jeopardy! The courage of the surgeon and the magnitude of his undertaking can be more fully appreciated when we reflect that anesthesia was unknown, that hypodermic needles for administration of stimulants had not yet been invented, that morphine had not been discovered; that saline injections for relief of shock were still in the future; that the operator had no skilled assistant to aid in the work; and that trained nurses were not yet in existence.

QUESTIONS

1. What is a tumor? Is its cause known?
2. What is the difference between benign and malignant tumors? Mention a representative of each kind.

3. What is malignant degeneration?
4. Enumerate and define three varieties of fibroid tumors of the uterus.
5. Where is cancer found in the uterus?
6. What is a cauliflower of the cervix?
7. In what period of life is cancer of the uterus usually found? Name the first symptom of the disease.
8. Does cancer of the uterus cause pain in the beginning?
9. What is the difference between cystic ovaries and ovarian cysts?
10. What is a twisted ovarian cyst?
11. Describe a dermoid cyst.
12. What is the treatment of any ovarian cyst, and what is its technical name?

CHAPTER VII

ABORTION. ECTOPIC PREGNANCY

Abortion and ectopic pregnancy are obstetrical complications, but as both conditions are taken care of in the gynecological divisions of all hospitals, they must be included in a book on gynecological nursing.

ABORTION

Abortion is the expulsion of the egg at any time before the twenty-eighth week of pregnancy, when the child is not yet able to live outside the uterus. The terms abortion and miscarriage may be used interchangeably; but as the word abortion has by common usage become almost synonymous with an illegal and criminal interruption of pregnancy, it is advisable for the nurse to employ the term miscarriage when speaking to patients.

We are here, however, less concerned with the causes of abortion than with its symptoms and the duties of the nurse in the treatment of this condition.

The first sign, as a rule, is a scant and painless bleeding, occasionally a gush of bright red blood which may or may not be followed by slight drawing pain in the back. This indicates that the uterus is beginning to contract and thereby rid itself of its contents. We denote this initial stage as "threatened" abortion and succeed not infrequently in checking its further progress by putting the uterus at rest. As a matter of fact, the nurse will not often have an opportunity to observe the very beginning of an abortion; but if she does, she should insist on having a physician called, and pending his arrival, she should put the patient to bed and place an icebag on the lower abdomen. The doctor will then complete her effort at quieting the uterus by prescribing an opiate, usually in the form of a rectal suppository.

If the "threatened" abortion is not checked, or if these attempts at treatment have remained unsuccessful, the contractions of the uterus become harder and therefore much more

painful, and the cramps may be almost as severe as those of labor at full term. The egg is thereby loosened from its moorings in the uterine mucosa and, with abundant bleeding, driven downward into the cervical canal which opens up to allow for its passage. The abortion has now become "inevitable," and further attempts at preventing it are useless. At this stage the nurse can do little more than quiet the apprehension of the patient who is greatly alarmed by the pain and the hemorrhage which, at times, may be quite excessive. A very few cases of death from hemorrhage have been reported, but in the vast majority of cases the bleeding, despite its great amount, is well borne by the patient.

Big clots of blood are next expelled, and in these the egg or part of it may be concealed. If the entire egg has come away, we speak of a "complete" abortion. If parts of it have remained in the uterus—and such would be the rule after the third month—we have to deal with an "incomplete" abortion. As the treatment differs greatly in the two conditions, it is important for the attending physician to see what has been expelled. For this reason all blood clots or tissues should be saved for him by the nurse, and it would be advisable not to let the patient use the water closet lest such material be flushed away. As a rule, nurses leave the clots in towels, pads, and the like, pending the arrival of the doctor. *This procedure is entirely wrong.* In the dried up material it would be impossible to distinguish any portion of the egg. The proper way is to put all expelled matter in a mason jar or basin filled with a weak formalin solution or, if the miscarriage takes place in the home, with diluted wood alcohol or the ordinary bath alcohol which may be found in most houses, or even with plain water if no preservative is at hand.

Should the condition of the patient become alarming from excessive loss of blood, as indicated by pallor, restlessness and clammy perspiration, and by the weakening of the radial pulse, the foot end of the bed must be raised, external heat applied to the body, and hot fluids given copiously to tide the patient over until the physician arrives.

A rare variety is the "missed abortion" where the egg dies in the uterus but is retained in the uterine cavity for weeks and even months without any attempts at expulsion.

ECTOPIC PREGNANCY

We have read in Chapter II, that at monthly intervals a graafian follicle bursts on the surface of the ovary and an ovum escapes. This tiny speck of white jelly which is barely visible to the naked eye, drops into the funnel-shaped fimbriated extremity of the tube and proceeds toward the uterine cavity. If it arrives there *unfertilized*, the uterine lining which had become thickened in anticipation, as it were, is cast off with concomitant bleeding, the menstruation, and the

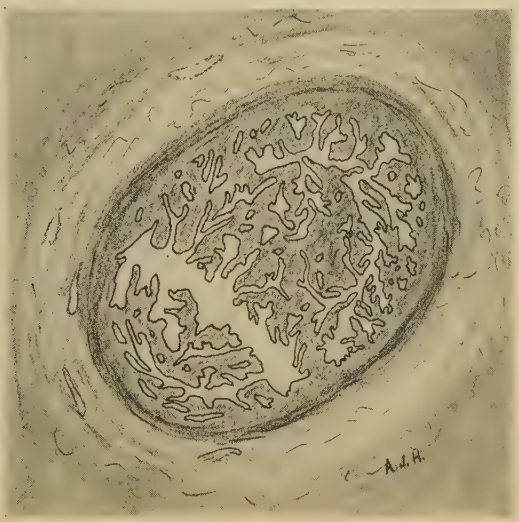

Fig. 57.—Cross section through a tube. This picture makes it plausible why the tiny egg may lose its way and lodge in one of the many side passages.

little egg is lost. If, however, conception has taken place, then the uterine mucosa, the endometrium, rapidly becomes still more thickened and succulent with blood so as to offer the fertilized egg a soft and secure nest within which to develop.

It is now generally assumed that conception, that is, the union of the egg and the male sex cell, the *spermatozoon*, occurs somewhere within the tube, probably nearer the fimbriated extremity, and that the egg has considerably increased

in size three or four days later when it enters the uterine cavity.

In some cases, however, the progress of the fertilized and rapidly growing egg through the tube meets with difficulties. At best the passage through the tube is narrow because of the innumerable slender folds of the mucous lining. Any inflammation may leave these folds greatly thickened and sticking or actually growing together (Fig. 57) so that the onward march of the ovum may be blocked. Or a kink of the tube, produced by the pull of an adherent appendix, or the push of a projecting tumor may obliterate the narrow passage; or else, the tube may be so unusually long that the egg becomes too large for the path way.

Whether these or any other factors are responsible, the result is the same: the egg, instead of reaching its normal destination, remains anchored within the tube and here undergoes its physiologic development. We call this condition an *ectopic* (out-of-place) or *extra-uterine* (outside-of-the-uterus) or, simply, *tubal* pregnancy.

In very rare cases, the ovum may become fertilized at the moment of the bursting of the Graafian follicles and remain and further develop within the follicle itself, thus giving rise to an *ovarian* pregnancy; and in still more uncommon cases, the ovum soon after fertilization may slip out of the tube or the ovary and continue its development somewhere between the loops of intestines, thereby instituting an *abdominal* pregnancy. But such cases though also "ectopic" or "extrauterine," are far too exceptional to be of practical importance; and, therefore, the terms "ectopic," "extrauterine," and "tubal" pregnancy may be used interchangeably.

In the large majority of tubal pregnancies, the ovum is located in the middle or outer third of the tube. Less often does the egg settle and develop in the narrowest part of the tube which leads through the wall of the uterus. We distinguish this particular location of an ectopic gestation by the term "*isthmical*" or "*interstitial*" pregnancy.

At first, there is nothing to disturb the growth of the ovum and the development of the embryo. A very few women may suspect that they are pregnant because they have missed a menstruation, but in most instances women pay little atten-

tion to the irregularity of the period, particularly if somewhat accustomed to such erratic behavior of the menses; and if, as is often the case, there has been a slight showing of blood at the menstrual date or a few days or weeks later, the thought of conception does not enter at all.

The ovum had been growing steadily, and the thin walls of the tube are giving way. Then—usually in the second month after the last regular menstruation, less often in the third month—the picture suddenly changes. One of two things may happen. The ovum, burrowing into the tubal musculature for more blood supply, may reach and break through the outer surface; and through the opening which need

Fig. 58.—Double tubal pregnancy. Right tubal rupture, left tubal abortion. (From Findley, "Diseases of Women," published by Lea and Febiger.)

not be larger than a tiny pin hole, but may be wide enough to let the entire ovum escape, blood gushes into the abdominal cavity (Fig. 58). This accident is called *tubal rupture*, and it usually occurs without any warning.

In the second eventuality—fortunately, the more frequent one—the development is somewhat less precipitous. The tube having reached the limit of its elasticity, resists further distention with contractions of its muscular walls. By these contractions some of the delicate connections between ovum and surrounding tubal mucosa are torn. As a result, there is bleeding within the mucosa, and this blood quickly spreads around the circumference of the ovum and loosens the latter more or

less extensively from its anchorage. At the same time, the amount of blood distends the tube still further and incites this organ to new contractions which, by repeated efforts, gradually force the ovum toward the only available opening, namely, the fimbriated end and, finally, expel it through the latter into the abdominal or pelvic cavity. This process which, likewise, is accompanied by much bleeding, is termed *"tubal abortion"* (Fig. 58).

What is the effect of all this on the patient? Usually without any tangible cause or premonitory symptoms, but sometimes following a fall, a jar to the abdomen, a blow or any heavy exertion, she is suddenly seized with an excruciating pain in one side or the other of the lower abdomen, often severe enough to cause her to faint. This pain may subside after a while, but returns at irregular intervals or it may persist in the form of an intense dull ache.

Simultaneously, the signs of internal hemorrhage put in appearance: restlessness, pallor, air-hunger, rapid, fluttering or barely perceptible pulse, pain in the region of the heart, dilated pupils, complaints of failing vision, cold clammy perspiration, cold extremities, and premonition of death, and—in severe cases—death itself.

In a case of tubal rupture the development is particularly tragic; for here a woman in the very best of health may be stricken without any warning and fall down in a faint from which she may not ever awaken, or she may pass through the various stages of internal hemorrhage so quickly that death occurs before help can be summoned.

In tubal abortion, the hemorrhage, as a rule, is not quite as abundant and its development more gradual, and the symptoms, though essentially the same, are a trifle less severe than after tubal rupture.

A thorough appreciation of the conditions and symptoms described in the foregoing is of the greatest practical importance to the nurse. In tubal rupture with its sudden onset and rapid progress help will come too late in all but the most exceptional cases. In tubal abortion, however, where danger signals exist, the nurse who has a knowledge of the condition, may urge the patient to call her physician at once and thus contribute toward the saving of the patient's life. There is,

further, the case of a woman sent to the hospital for observation, the suspicion being an ectopic pregnancy. The nurse in charge of such a patient, will do her utmost to prevent rupture or contractions of the tube. She will—with the approval of the physician—place an ice-bag on the lower abdomen, assist the patient in any change of position, lift her on and off the bed pan, prevent any straining on urination and defecation, and, in general, remove any cause for exertion. If in spite of all precautions, an internal hemorrhage occurs, she should be able to recognize the gravity of the symptoms at once and notify the intern or attending physician stating the apparent urgency of the situation. Meanwhile, she should lower the head of the patient and, lest precious time be lost, have everything in readiness for proctoclysis, hypodermoclysis, and intravenous infusion (see page 242). It would also be good foresight in her to give warning to the supervisor of the operating room so that, again, valuable minutes might be saved, should the attending physician decide to operate at once. Under no circumstances, however, should she administer a stimulant as this would only intensify the bleeding. On the contrary, morphine would be indicated in such a case but, of course, she is not entitled to inject this without permission by the doctor.

Immediate laparotomy for the purpose of removing the pregnant tube is the sole remedy and only possible means of checking the bleeding. Exceptionally, when the patient appears to be too much depleted, the operator may decide to postpone the operation a short time until the shock has been slightly counteracted by such measures as intravenous infusion of saline solution or blood.

If the patient rallies from the operation and receives painstaking care afterward, she has a fair chance to recover though an astonishingly large quantity of blood may have been found in the abdominal cavity, because women stand loss of blood surprisingly well.

From two to four days after the operation there occurs in all cases a more or less copious flow of blood from the vagina containing shreds or large pieces of tissue, and sometimes causing considerable cramping pain. This happening need give no concern either to patient or nurse as it is simply due

to the fact that the thickened uterine lining which had prepared itself against the advent of a fertilized ovum, is being cast off now that pregnancy is definitely at an end; in other words, this bleeding is merely the delayed menstruation.

Formerly nobody thought it possible to diagnose an ectopic pregnancy *before* the tube had ruptured or aborted, and the abdomen was filled with blood. Nowadays a trained gynecologist is well able to detect an "unruptured" tubal pregnancy in many a case. This fact is of great practical importance in a

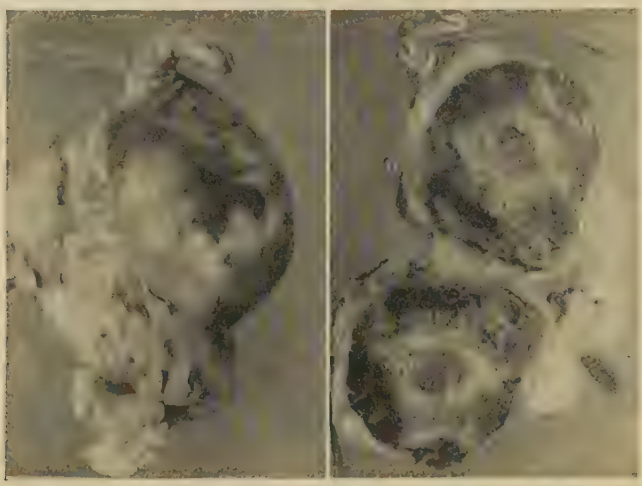

Fig. 59.—An "unruptured" tubal pregnancy. Specimen removed by operation after first attack of pain. The surface of the tube is still intact, but its contents are destroyed by bleeding. There was no free blood in the abdominal cavity.

Catholic hospital where, according to the tenets of the Church, operation is not permissible as long as the fetus is alive. How long, then, does the child live in an ectopic pregnancy? The answer is: Only in the beginning when the patient is not even aware of the fact that she is pregnant. The moment she has pain, we may say with a high degree of certainty that the fetus is dead. For this pain means that the tube has suddenly become distended by bleeding *around* the ovum. The latter is thereby loosened from its attachments within the mucous membrane of the tube, and the embryo must die inside of the ovum

because it is no longer nourished. At this stage an examination reveals an oblong swelling in one of the tubes, and this, taken together with the sudden onset of pain and the history of delayed menstruation, permits of the diagnosis of ectopic pregnancy even though the tube is still unruptured. In other words, *an ectopic pregnancy can only be diagnosed when there has been some bleeding within the tube, and at that time the fetus is already dead.* This condition is well illustrated by a specimen recently removed by me after the first attack of pain (Fig. 59). Though the tube is still intact, the cross section shows that the ovum and the embryo have already been destroyed by bleeding *within* the tube. There is, therefore, no reason on religious grounds to delay operation until the bleeding in the tube will be followed by hemorrhage in the abdominal cavity and the chances of recovery will be greatly reduced.

Medicine has always contended that a tubal pregnancy should be operated on, no matter in which stage it is encountered; and I have tried to show that this standpoint presents no conflict whatever with the tenets of the Church.

I can not close this chapter without mentioning a very unusual and interesting sequel to tubal abortion. There are cases on record where the patient survived the accident without operation. In most of these instances the tubal pregnancy apparently had progressed further than is usually the case. The fetus slipped into the pelvic cavity and was disposed of in one of two ways. Either there was an infection around the fetus causing an abscess which eventually broke through into the bladder or rectum; the fetal bones were discharged gradually through either of these passages, after which the patient recovered. Or else, the fetus underwent a process of mummification; lime salts were deposited in its body, and the result was a mass of very hard consistency, the so-called "stone child" or *lithopedion.* In the unique case recently operated upon by Dr. L. Rassieur, of St. Louis, there had been an ectopic pregnancy in *both* tubes, and both fetuses had undergone lithopedion formation (Figs. 60, 61).

QUESTIONS

1. What is an abortion?
2. Define threatened, inevitable, complete, and incomplete abortion.
3. What are the symptoms of abortion?

Fig. 60.—A twin lithopedion or stone-child. (Courtesy of Dr. L. Rassieur.)

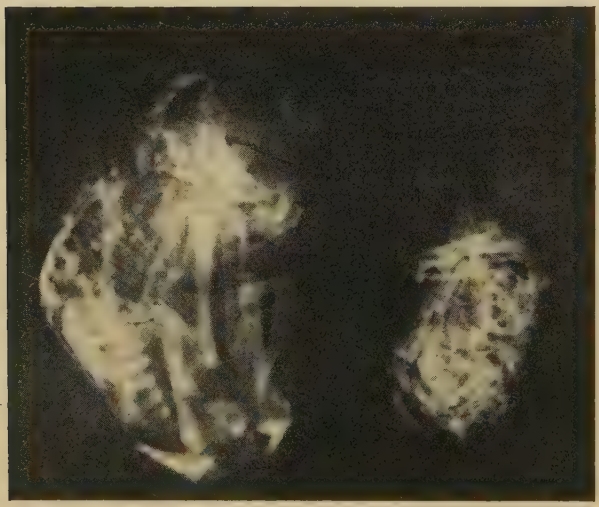

Fig. 61.—*x*-Ray picture of the specimen shown in Fig. 60.

4. How should the nurse take care of any material expelled, and why?
5. Give the nursing care of an aborting woman until the doctor arrives.
6. What is ectopic pregnancy? What are the synonymous terms?
7. Why is it dangerous? How can a nurse help to prevent its dangers?
8. What are the nurse's duties in a case of internal hemorrhage from ectopic pregnancy?
9. What is the treatment in ectopic pregnancy?
10. What significance has bleeding from the vagina in the first few days following operation?

CHAPTER VIII

DISTURBANCES OF STRUCTURE

MALFORMATIONS

Malformations of the genitals are faults in the development of these organs during intra-uterine life. Of such genital malformations we need mention but three which the nurse may have occasion to observe; in fact, she may be the first to discover them. These are: double vagina, atresia of the vagina, and hermaphroditism.

To make the meaning of these anomalies clear, it will be necessary to cast a rapid glance over the normal development of the genital organs.

In an embryo of about one-eighth inch in length, that is to say, two or three weeks after conception, there appears a tiny vertical elevation upon the posterior abdominal wall on either side of the spinal column, in about the locality where, in later life the kidneys are found. This elevation is called the genital ridge because it represents the origin of the genital organs. In the next two or three weeks the genital ridge increases in size and forms a protrusion which eventually develops into the sex gland—the ovary in the female (Fig. 62). Near its upper pole, there is seen a funnel-shaped depression. The solid tip of this funnel continues to grow into a thin cord which extends along the abdominal wall downward until it reaches the pelvic cavity. It then turns inward toward the midline of the body to meet its fellow from the other side. After their fusion has been accomplished, the two cords lying side by side, turn downward almost at right angles and grow toward the lower-most end of the body which they reach at the place which, later, becomes the vulva.

A hollowing out process goes on simultaneously with the downward extension of the cords which thereby are transformed into canals, known as the *Muellerian ducts.* The upper thirds of the muellerian ducts which remain separate

from each other, are the *Fallopian tubes*. The lower two-thirds which touch each other, are at first separated by a dividing wall (Fig. 63). This wall or septum disappears later so that there is but one cavity within the two muellerian ducts. The upper half of this portion becomes the uterus, the lower half the vagina. The canalization of the Muellerian

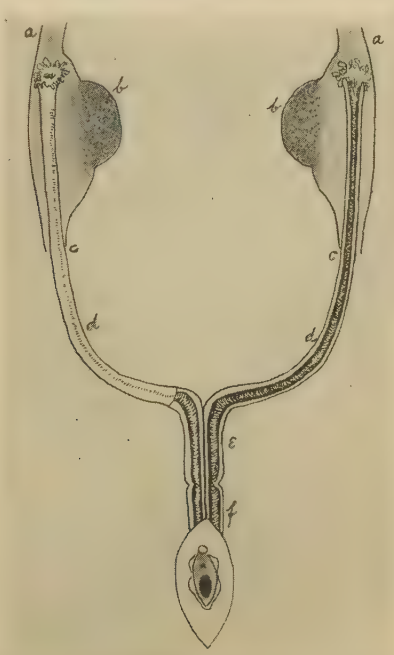

Fig. 62.—Diagram of the development of the female genital organs. *a*, Genital ridge; *b*, ovary; *c*, Muellerian ducts; *d*, tube; *e*, uterus; *f*, vagina.

ducts extends all the way down and eventually breaks through the outside of the body. The lowermost end of the canal or vaginal opening is closed by a perforated thin membrane, the hymen or maidenhead.

Double Vagina.—Occasionally the dividing septum does not disappear but persists in part or entirely between the two muellerian ducts. This explains the occurrence of a double vagina and—higher up—a double uterus (Fig. 64). The

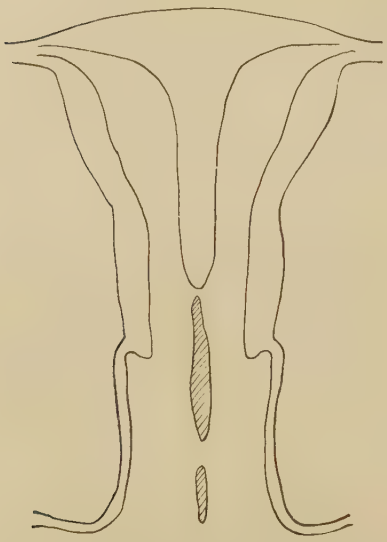

Fig. 63.—Septum in uterus and vagina.

Fig. 64.—Double vagina and uterus. (From Dudley's "Gynecology," published by Lea and Febiger.)

clinical importance of a double vagina is not very great. The patient need have no inconvenience, may not even know of its existence. She may menstruate through both vaginal canals. She may conceive and expel the child through one vagina; the other vagina is then pushed to the side. On the other hand, the duplication may prevent conception, and as it is comparatively easy to cut out the dividing wall, the nurse

Fig. 65.—Imperforate hymen.

on observing a double opening, should report her findings to the attending physician.

Atresia of Vagina.—In rare cases, the hymen is "imperforate," that is, it shows no opening whatever; or the vagina *above* the hymen is occluded (Fig. 65). Such a complete closure or obstruction is termed an *atresia*, and we call it congenital atresia because the child comes with it into the world. More often, however, such an atresia is acquired after birth.* The usual cause is a vaginal inflammation in

* Acquired atresia is grouped here with congenital malformation because the two anomalies have the same effect on the bearer.

infancy. Measles, scarlet fever, diphtheria, and other acute diseases may cause an infection in the vagina. Sometimes the child acquires such a vaginal infection from a grown-up. In a recent case of this kind I found that the girl, then three years old, had been sleeping in the bed of her mother who had mumps at the time. In any case, the infection leads to an ulceration in the vagina; the raw surfaces first glue, then firmly grow together, and an atresia results. The slight vaginal discharge which exists at the time, is hardly noticed and later forgotten. The condition whether congenital or

Fig. 66.—Vaginal atresia with retained menstrual blood.

acquired, causes no symptoms until, at puberty, the menstrual flow occurs but is pent up behind the obstruction. During the first few months there is comparatively little discomfort because the vagina can be stretched a good deal and hold a considerable amount of retained blood. But as time goes on, there is very severe pain at monthly intervals, and intense bearing down and a feeling as if the lowermost part of the abdomen would be rent asunder, and all this without the slightest show of blood. Even between these regular attacks of pain, there is a continuous heaviness and pressure in the abdomen and difficulty both in passing urine and stools. An examination by the attending physician through the

rectum clears up the situation at once (Fig. 66), for the mass of accumulated blood has formed a large tumor which distends the vagina as far as the bony walls of the pelvis will permit, and on top of this mass there is a smaller mass composed of

Fig. 67.—A male hermaphrodite. (W. Blair Bell, "The Sex Complex," Baillière, Tindall and Cox, publishers.)

the uterus which has likewise been distended by the damming back of the menstrual flow. The condition is extremely painful and may not be without serious and lasting danger, but, fortunately, the proper treatment, which is surgical, is quite simple. The nurse who knows the meaning of vaginal obstruction and its inevitable consequences, will act promptly. If she notices an imperforate hymen while bathing an infant, or if she learns of vaginal discharges in older children, she will urge the parents to have the little patient examined by a physician.

Hermaphroditism.—Hermaphroditism is the technical term applied to the existence both of ovaries and testicles in one and the same individual, in other words, a man and a woman in *one* person. Such a true hermaphroditism is excessively rare; not more than three or four authenticated cases exist in the literature of the world. Pseudo-hermaphroditism, on

Fig. 68.—A female hermaphrodite. (Gould and Pyle.)

the other hand, though also rare, yet occurs sufficiently often to be of practical importance. A pseudo-hermaphrodite is an individual who has the sex glands of one sex and the external genital organs of the opposite sex. He may, for example, have testicles (which usually are hidden in the inguinal canals), and external female genital organs (major and minor lips, vagina, etc.). As a matter of fact, the external genitals are never quite normal. They merely *resemble* those of the opposite sex; but the obstetrician who pronounces the

sex of the newborn, hardly ever gives more than a casual glance before making his decision. It would be the business of the nurse who takes care of the infant and has better opportunities for careful observation, to call the physician's attention to the genitals if they appear in the least different from normal ones. For it would obviously be a serious matter for any person in later life, to have been labelled wrong, to be raised as a girl, though in reality a boy, and *vice versa*. The general appearance of such hermaphrodites need not be out of the ordinary. One would hardly suspect the person depicted in Fig. 67 of being a man; and on the other hand, when the long-bearded old man, shown in Fig. 68, was treated for pleurisy in a hospital in Paris, no one thought of him as a woman until, at autopsy, uterus, tubes and ovaries were found. There is quite a literature on individuals who were married as women, in whom postmortem examination disclosed the presence of hidden testicles; and conversely, there is, for instance, the case of a male school teacher in whom an abdominal operation revealed a large ovarian cyst.

We do not know beyond a mere surmise what causes hermaphroditism. Suffice it for the nurse to bear in mind that it does exist, and not to pass it over if a malformation of the outer genitals excites her suspicion.

QUESTIONS

1. Name three malformations which you may be able to observe.
2. What symptoms would be caused by an imperforate hymen, and at which period of life would such symptoms become evident?

CHAPTER IX

DISTURBANCES OF FUNCTION

AMENORRHEA

Amenorrhea is the absence of the menstrual flow during the reproductive period of woman's life, after menstruation has already become established. For this reason we do not speak of amenorrhea before puberty nor after the menopause.

If the flow of blood fails to appear at a single menstrual period, we call this suppression of menses. To this class belong the cases in which exposure to cold or wet during a menstrual period, excitement, shock, or sudden fright leads to an abrupt stoppage of the flow. In such instances the next period usually occurs on time.

In true amenorrhea the cessation of menses lasts for at least a number of months. The causes may be either local or general. Foremost among the local causes is pregnancy. During pregnancy the uterus does not menstruate. Nor is there any menstruation in the majority of nursing mothers though there are a good many exceptions to this rule. Severe childbed fever or very deep tears of the cervix may cause amenorrhea. Other inflammations about the uterus and ovaries may have the same effect, but usually they cause the opposite, namely hemorrhages. Sometimes amenorrhea is observed in the presence of vesical fistulae or when the uterus has been scraped or cauterized too strenuously. Removal of both ovaries by operation will at once produce amenorrhea; for, as explained in Chapter II, there can be no menstruation without ovulation. Removal of one ovary, on the other hand, does not affect the menstrual function.

Of the general causes of amenorrhea, tuberculosis is the most widely known; it may disturb the menstrual function even in earlier stages of the disease. Chlorosis quite frequently produces amenorrhea. In exophthalmic goiter and severe forms of syphilis and nephritis the disappearance of

menstruation is often, but not regularly noted. Any acute infectious disease such as scarlet fever, articular rheumatism and typhoid may cause amenorrhea which usually lasts through convalescence until health is reestablished. In very obese women menstruation may either cease altogether or become abnormally scant. Chronic poisoning with lead or mercury, morphinism and alcoholism occasionally produce amenorrhea.

Where the genital organs are not developed normally, menstruation may never occur. Finally, there is an apparent amenorrhea due to imperforate hymen or occlusion of the vagina; but as has been explained in Chapter VIII, this is merely a concealed menstruation which cannot find its way out.

This list which is by no means complete, will show the nurse that amenorrhea may be produced by a great many causes and that each case requires thorough medical examination to determine the specific cause and to secure, if possible, the cure of the condition.

MENORRHAGIA

The opposite of amenorrhea is menorrhagia or excessive and prolonged bleeding at the menstrual period. It has been pointed out in Chapter II that the average loss of blood at each menstruation is about 4 ounces. There are, of course, wide variations. A woman may lose twice that amount and yet be perfectly healthy. On the whole, however, if the menstruation lasts a week or longer, if the blood gushes out in large quantities or if it contains large clots, we have to deal with a distinct disturbance of the natural function which requires investigation. Even if there are no other complaints, the steady drain on the body which gives the organism not enough time to recuperate and to replace the loss of blood, is bound to tell on the general condition. Such patients sooner or later suffer in many ways from the effects of depletion which we call *secondary anemia.*

Among the general causes we find that the same diseases which produce amenorrhea in one individual, may lead to menorrhagia in another. The local causes of excessive menstruation are quite numerous and comprise various

affections of the uterus, tubes and ovaries. Chief among them are irritation and inflammation of the uterine mucosa, fibroids of the uterus, infection of the tubes, and tumors of the ovaries. In recent years, the rôle of the ovary in the causation of menorrhagia has been thoroughly studied. Just as the ovaries stimulate the uterus to menstruate normally, so they may, if their own function is disturbed, create excessive menstruations.

The successful treatment of menorrhagia depends on the determination of the underlying cause in each case. Yet, many women become so indifferent to the habitual loss of blood that they seek help only after they have become thoroughly depleted.

METRORRHAGIA

While menorrhagia means an undue amount of bleeding only at the menses, metrorrhagia means abnormal bleeding at any time of the month and without relation to menstruation. Such bleeding may be due to a large number of causes. Very often it is the first manifestation of some malignant growth anywhere in the genital tract. For this reason, metrorrhagia is a symptom of particularly great importance. If in a given case it should signify cancer, that fact should speedily be determined, for, as discussed at length in Chapter XII, the cure of cancer depends on its prompt recognition. This recognition, again, can only be accomplished by a medical examination to which bleeding women should submit without delay. Unfortunately, there is far too much indifference among the majority of women toward bleeding of any sort. The nurse who is aware of the significance of metrorrhagia, has, in her capacity as an educator, ample opportunity to point out the possible dangers of procrastination and to urge patients to seek expert advice.

DYSMENORRHEA

Dysmenorrhea means pain in the lower abdomen at the time of the menstrual period. It is rather difficult to define this pain because it differs widely in different individuals. What a robust woman with a strong nervous system may feel merely as an unpleasant sensation, may be unbearable agony

to another, less resistant person. The pain is usually described as colicky; women who have borne children, liken it to labor pains. It is located in the depth of the abdomen, radiating to the sides or the thighs; many women feel it mostly in the back. The degree of pain varies within wide limits. Sometimes the intensity is so severe that it completely incapacitates the sufferer, the patients writhing in agony and crying out loud. In other instances, the pain is not intermittent but more or less continuous, and assumes a burning, bearing-down character.

Very often the local pain is associated with general disturbances such as nausea, vomiting, constipation or, on the contrary, diarrheas, headaches, various forms of neuralgias, acne and other skin eruptions, frequency and urgency of urination, etc.

The beginning of the pain varies. In some women there is, for several days prior to the period, a constant malaise and bearing down sensation which steadily grows more intense until relieved by the appearance of the flow. In other cases, the cramps start but a few hours before menstruation and cease when free flow is established. Again, the pain may not begin until after the period has commenced, and may continue for hours or days. Some patients will tell us that the first few menstruations had been painless, others that dysmenorrhea suddenly put in appearance following a nervous shock or exposure to cold or wet. Again we hear that marriage and, more often still, the first confinement put an end to the menstrual suffering. In rare cases, dysmenorrhea may persist after childbirth, or it may not be acquired until afterwards. External circumstances such as change of residence, climate, occupation, mode of life, exert at times a distinct influence on the occurrence or intensity of dysmenorrhea, and there are also cases where once or twice a year menstruation takes place without any pain. The amount of the menstrual flow varies. In the majority of cases the loss of blood is rather small or entirely within normal limits; conversely, we are told of profuse bleeding and the expulsion of blood clots.

Such patients, then, present a greatly variegated ensemble of complaints which may be due to a great diversity of causes. In a general way, we may divide the cases of dysmenorrhea

into two large groups: those in which the menstrual pain is associated with, and apparently caused by, definite pelvic disorders of one form or another; and those in which the suffering occurs in the entire absence of gross changes in the pelvis. In this book we need not discuss the topic further beyond saying that it is essential to find the specific cause in each case so that the therapy may be less of a hit-or-miss variety; and this is obviously impossible without a thorough medical examination.

I can not, however, leave the subject without a reference to dysmenorrhea in young girls. In these, the causes of menstrual pain are usually quite simple and have but little reference to the pelvic organs. Enlightened mothers will not let their young daughters suffer month after month without consulting a physician. Yet, there are still in this day and generation millions of women who object to such a consultation from a mistaken sense of regard for the modesty of their daughters, who will console the girl with the prospect of painless menses after marriage and in the meantime condemn their own offspring to unnecessary suffering. Here, too, a grateful field of educational work opens up for the tactful nurse.

LEUKORRHEA

The lining of the genital tract, like all mucous membranes of the body, is covered with a small amount of moisture which serves the triple purpose of protecting the delicate surface epithelium from decay due to dryness, of restraining pathogenic bacteria, and, in the lower half of the genital passage at least, of supplying lubrication. This secretion is, in the main, derived from glands and is colorless. In the vulva it is thin and serous (watery). In the vagina where there are but few glands, it is largely a sort of sweating and appears as a uniform, milky fluid, due to the admixture of cast-off surface epithelium; if the degree of this peeling or scaling, technically spoken of as desquamation, is in excess of the available serous fluid, the vaginal secretion is more mealy, flocculent. The greater part of the moisture in the vagina comes from the uterus. The cervical glands produce a clear, tenacious mucus, those of the endometrium a thin, serous fluid. If these are not thoroughly mixed with the desquamated vaginal epithelium, a flaky

appearance results. The chemical reaction of these secretions varies in the different parts; in the vulva and the uterus it is alkaline, in the vagina it is acid. The amount of secretion is increased before and after menstruation, in pregnancy, labor, and during sexual excitement; and it is decreased in childhood and after the menopause.

Any gross departures from the normal color, consistency, reaction and amount of genital secretions are classified under the name of leukorrhea, or vaginal discharge. This latter expression is a misnomer since we have just seen that most of the vaginal discharge originates in the cervix or uterus. Leukorrhea means, literally translated, a white flow. In reality, it appears in most cases in various shades of yellow, at times with a greenish tint, or is more or less brownish in color. The yellow and green color is due to the action of bacteria, the brown discoloration is caused by decomposed blood. The odor is almost always unpleasant. When excessive in amount, it often irritates the mucous membranes of the vulva and also the skin about the external genitals and even on the inner aspect of the thighs, causing a marked, diffuse reddening. We call this irritation of the skin *intertrigo*. The patients complain of burning after urination, of smarting and itching.

Leukorrhea at no time constitutes a disease in itself. *It is merely a symptom caused by a wide variety of abnormal conditions*, and no treatment should be instituted until after a search for the underlying cause. The nurse, therefore, should not make the common mistake of suggesting to such women to take vaginal douches regularly. The cases where leukorrhea can actually be cured by vaginal douches, are few and far between. Usually, a douche merely washes out the abnormal secretion mechanically, but as soon as the douching is over, the production of new secretion continues. Moreover, it must be obvious that no douche can be of benefit, if the source of the leukorrheal discharge is inside the uterus.

The habit of douching is enormously widespread among women. It is based on the erroneous idea that it is required for cleanliness, and the analogy with brushing one's teeth is usually cited in explanation. But while there are food particles between the teeth which must be removed to prevent decomposition, no such decomposing material exists in the

vagina. Indeed, habitual douching is apt to lead to leukorrhea because it does away with the natural and protective moisture of the vaginal mucosa.

Douches, therefore, are entirely superfluous in healthy women, and in cases of leukorrhea they should be given only on instruction by a physician. The enumeration of the various causes of abnormal discharges and the different methods of treatment falls outside the scope of this book. It suffices to underscore the statement that every case of leukorrhea calls for a medical investigation.

I will not, however, omit at least a brief reference to a very recent method of powder treatment of leukorrhea. A very fine white powder, called kaolin or Chinese pipe clay is mixed

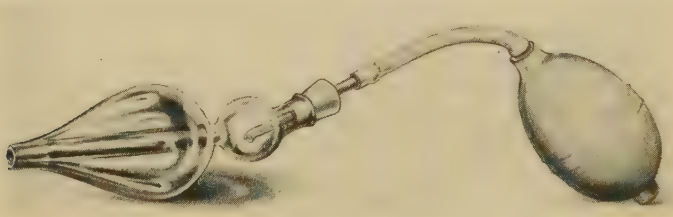

Fig. 69.—Nassauer's "siccator."

at equal parts with bicarbonate of soda and is poured through a speculum into the vagina in a sufficiently large quantity to fill every fold in the latter. One or two cotton tampons serve to keep the powder inside until the patient removes the tampons the next day. Dr. Nassauer, of Munich, the inventor of this method, designed a handy apparatus, called "siccator" (Fig. 69), by which the vagina is inflated with air and the powder simultaneously deposited on the walls of the vagina.

The tampons which were just mentioned, are pieces of cotton tied up with a string. One or more may be introduced into the vagina through a speculum with a dressing forceps. The strings must be long enough to protrude from the vagina so that the patient may be able to remove the cotton after twenty-four hours. Tampons are used chiefly to hold medicines for a while in the vagina, as in the case of the powder treatment described above. If some liquid medicine (usually glycerin with or without addition of other drugs) is to be

kept in the vagina, a larger number of such tampons, arranged in the form of a "chain" or a "kite" tampon (Fig. 70) is preferable.

Fig. 70.—"Kite" or "chain" tampons.

QUESTIONS

1. What is amenorrhea? Give three causes. What is "apparent" amenorrhea?
2. Define menorrhagia and metrorrhagia. What is the particular significance of the latter?
3. What is dysmenorrhea?
4. What is the natural secretion of the genital mucous membranes?
5. What is leukorrhea?
6. Is it a disease of its own or a symptom?
7. Is it necessary for healthy women to take vaginal douches regularly?

CHAPTER X

BLADDER AND RECTUM

No gynecological textbook is complete without a discussion of bladder and rectum. In health and disease, these two organs are most intimately associated with the genital tract. Anatomically they are closely connected with the latter (Fig. 3) and functionally they are affected by gynecological diseases and, if themselves diseased, affect, in turn, the genital organs.

THE BLADDER

The bladder is a limp, pliable sac with muscular walls, about $\frac{1}{4}$ inch in thickness, which lies between the symphysis and uterus and is connected, on its nether side, with the cervix and anterior vaginal wall. At its lowermost pole there are the tiny openings of the ureters through which urine drops ceaselessly from the kidneys.

As the bladder fills, it rises from the pelvis into the abdominal cavity, gradually assuming a round shape, and pushes the uterus backward (Fig. 71). This is the reason why *before examination or operation the bladder must be emptied.* When the bladder reaches its capacity which is about 8 ounces, the sphincter muscle which surrounds the lowermost pole or neck of the bladder like a very tight ring, is forced to relax by way of a rather intricate mechanism. This permits the urine to be expelled through the urethra. The urethra is a tube with muscular walls, about $1\frac{1}{2}$ inches in length, which runs in a slight curve around the lower border of the symphysis. Its outer opening is the meatus, described on page 19.

At no time is the bladder completely at rest. Immediately after voiding, the gradual distention with urine begins anew.

Urinary symptoms are very common in women. *Polyuria* is an excessive secretion of urine, either temporary, as for instance in nervous excitement, or permanent, as in diabetes. *Oliguria* is scantiness and *anuria* complete stoppage of urinary

secretion. Both are most often sequels of diseases of heart and kidneys and are particularly alarming when they appear as complications after operations. In *retention*, on the other hand, the kidneys secrete urine in normal quantity, but the patient is unable to void; in such cases, therefore, there is only an apparent anuria. Such a retention is quite usual

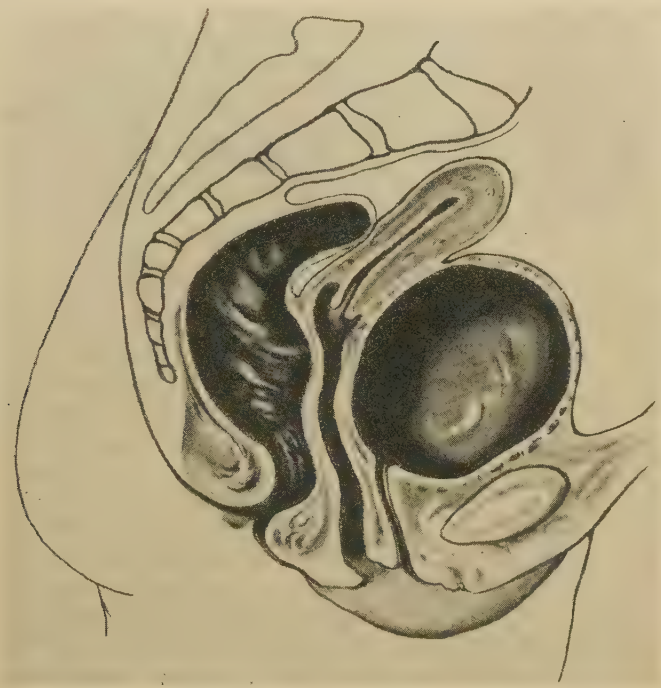

Fig. 71.—The full bladder pushes the uterus out of place. (Gellhorn "Non-operative Gynecology," published by D. Appleton and Co.)

after operations or childbirth until the patients become accustomed to void lying down. Nervous persons may, under the influence of a fright, be incapable of urinating. I remember the case of a shop girl who fell from a step ladder, and had a "tumor" filling the entire abdomen up to the ribs, when she was brought to the hospital the next day. This tumor was the overdistended bladder from which 56 ounces of urine were drained through a catheter. Tumors, stones or other foreign

bodies *within* the bladder or tumors or other conditions of the genitals pressing upon the urethra may so block the passage that retention results.

Dysuria is frequent and painful urination. The causes of this symptom are very numerous and may lie both within and without the bladder. Most common among these is *cystitis* which is a purulent catarrh of the lining of the bladder and characterized by the presence of pus and bacteria in the cloudy urine. Micturition (which is another name for urination) is very frequent and associated with pain in various degrees. At the end of the act of voiding, the patient experiences a more or less sharp cramp-like pain in the bladder and feels that the latter is not completely empty. The cramp is due to involuntary contractions of the sphincter muscle of the bladder and is analogous to, but much more severe than, the sensation one has if a speck of dust has gotten beneath the eye lid. This cramp-like pain is called *tenesmus*.

A well known source of infection, and one which greatly concerns the nurse, is the catheter. Particularly in those cases where, as after operations, catheterization is required repeatedly, cystitis is a rather common occurrence either because the catheter was not sterile or permitted to become contaminated, or because lack of gentleness in catheterization produced small scratches in the urethra or the neck of the bladder which secondarily became infected. To prevent such an undesirable accident and to render catheterization both painless and harmless should be the ambition of the nurse, and the reader is urged to observe the minutest details of the procedure which is described in Chapter XV.

Incontinence is the inability to retain the urine. This may be either complete as in vesical fistulae (Chapter V) or partial as in relaxation of the vaginal wall subsequent to childbirth. In such cases coughing, sneezing, laughing, in fact, any sudden exertion which increases the pressure within the abdomen, as, for instance, lifting a weight or climbing stairs, proves too much for the constricting power of the weakened sphincter, and urine escapes involuntarily as a result.

Another form of involuntary incontinence is *enuresis* or bed-wetting. This occurs more often in children than in adults.

When the pelvic floor, that mass of muscles and fasciae which are spread across the outlet of the pelvis, are overstretched or torn in childbirth, the various pelvic structures, deprived of their support, sink downward. The anterior vaginal wall as a rule takes the lead in this descent, and as the base of the bladder is intimately connected with the vagina, it, too, sinks down and forms a pouch which, with the overlying vaginal wall protrudes into the vulva. This condition is called *cystocele* (see also page 66). In high degrees where a soft and elastic mass, about the size of an apple, is visible outside of the vulva, the patients are often unable to void until they have pushed the protruding parts back into the vagina; and even then, a certain amount of urine is apt to remain behind. We speak of *residual urine* if the bladder has not been emptied completely.

THE RECTUM

The rectum lies between uterus and vagina and the sacral bone. It is the lowermost portion of the large intestine and represents a hollow tube about 8 inches in length. In its course it follows the curve of the sacrum. Below, it terminates in the anus (Fig. 3). Between the anal opening and the rectum proper is the *anal canal*, about 1 inch long, which runs forward or, in the lying woman, upward. This anatomical fact which is often ignored, is of great practical importance. The anal canal is rather narrow owing to the constriction of the sphincter muscle of the anus. Just above the anal canal the rectum is considerably dilated forming a pouch which is called *ampulla*. It is in the ampulla that the stools collect. The "loaded" rectum, then, pushes the uterus upward and forward. Gynecological examination is thereby interfered with, not only because the true position of the genital organs is obscured, but also because the examining fingers find not enough room in the vagina. Moreover, a recto-abdominal examination (page 143) which is often indispensable, becomes impossible. For this reason, the nurse will have to empty the rectum by a cleansing enema, whenever time permits. In giving such an enema, the direction of the anal canal should be borne in mind lest by inserting the enema tip improperly, unnecessary pain be caused.

This precaution is even more necessary where the anus and the anal canal are the seat of painful conditions. Of these there are chiefly two which the nurse may frequently encounter in her daily work. These are *fissures* and *hemorrhoids*.

A **fissure** is a crack or elongated ulceration in the mucous membrane at or near the anal opening. It is caused by a scratch either during the passage of a hard fecal mass or by introduction or expulsion of a foreign body, sneezing, coughing, faulty instrumentation, or, quite commonly, during childbirth. Though in itself only a trifling lesion, comparable to a cracked lip in cold weather, a fissure is responsible for very acute suffering. The pain following each bowel movement is often so great that the patient voluntarily delays bowel action with the result that the dry and hard fecal matter causes all the more pain at the next defecation. Then particles of feces lodge in the rent, an infection occurs, and the irritation produces a spasm of the sphincter which in its turn causes more irritation so that the ulcer never has a chance to heal. Some bleeding takes place and adds an element of apprehension, and if referred symptoms in the form of frequent and painful urination or of pain in the lower back occur, the little and seemingly insignificant crack in the anal mucosa may become a powerful factor in producing or aggravating neurasthenia. Further, there is often a most distressing itching about the anus and, finally, even an abscess may form.

This distressing condition which is often found in gynecological patients, exacts from the nurse particularly circumspect attention. If such patients require enemas, these should be given with the patient lying on her side or in the Sims position (page 145). All manipulations should be under guidance of the eye and with good illumination. The patient should be asked to strain which relaxes the sphincter, and a well lubricated enema tip or tube of *small calibre* should be introduced with great gentleness. For this reason I prefer soft rubber catheters to the popular stiff colon tubes. After each defecation, the anal region should be cleansed with cotton sponges and warm water, gently dried and covered with an ointment which may be prescribed by the attending physician. Cleansing with toilet paper increases the irritation.

Hemorrhoids or piles are varicose veins about the anus and anal canal, and are always the result of some condition which interferes with easy circulation: a sedentary mode of life, for instance, or an occupation which entails long hours of standing; most common of all, chronic constipation and the habitual use of cathartics; overeating and lack of exercise; disease of the intestinal tract; pregnancy; retroflexion or a fibroid so located as to impede the return flow of blood.

External hemorrhoids protrude from the anal opening; *internal hemorrhoids* lie within the anal canal.

Many people carry hemorrhoids a lifetime without discomfort, but in the majority of cases a multitude of symptoms is complained of, which in some instances may be merely a sense of fullness and weight or a throbbing sensation, in others a more or less constant burning and itching about the anus, and in still others, the most intense pain. Not infrequently painful sensations radiate into bladder and back. The pain becomes acute if internal hemorrhoids do not slip back after defecation as is the case usually, but remain outside and are constricted by the sphincter. The prolapsed node then increases suddenly in size, a blood clot forms within the pile, and if an inflammation sets in, the anal region becomes edematous. The pain is at times so overwhelming that collapse may occur. The inflammation may recede, yet in some cases suppuration of the hemorrhoidal nodes may occur. Fissures are often associated with hemorrhoids and add their quota of distress.

Bleeding is a fairly frequent symptom. The loss of blood, as a rule, is slight and gives the patient a feeling of relief, but occasionally the hemorrhage may be persistent and so abundant that a marked secondary anemia and even death may follow. Since hemorrhoidal bleeding may be caused by a cancer higher up in the rectum, patients should be urged to seek medical examination without delay.

The treatment of hemorrhoids lies in the hand of the physician. The nurse, however, should bear in mind that lack of gentleness may cause unnecessary pain in external, and bleeding in internal hemorrhoids. The same precautions as in fissure should be observed and irrigations or injections must be

made through small soft rubber catheters rather than through stiff colon tubes or hard enema tips.

QUESTIONS

1. Briefly describe the bladder and define its relations to the uterus.
2. What is the average capacity of the bladder? What is the shape of the full bladder?
3. Why should the bladder be empty before examination or operation?
4. How does the bladder communicate with the outside?
5. Define micturition, polyuria, anuria, urinary retention.
6. What is cystitis? Name one of its more common causes.
7. Define incontinence, enuresis, residual urine.
8. Describe the relations of anus, anal canal, and rectum.
9. Why should the rectum be empty before examination or operation?
10. Name two painful conditions about anus, frequently encountered in gynecological patients.

CHAPTER XI

THE NURSE AND THE PROBLEM OF VENEREAL DISEASE

INFECTIONS which are transmitted by sexual relations are called venereal diseases. The most important and prevalent ones are gonorrhea and syphilis, and their signs and symptoms have been described in Chapter III. There is, however, another and wider aspect to them which includes not only the individual but also his family, the community, and the nation, and discloses problems of grave importance with which every nurse, in fact, every intelligent lay person should be familiar.

GONORRHEA

The problem uppermost in one's mind in connection with the subject of gonorrhea, is sterility. Sterility is inability of reproduction. Of the various causes of sterility, both in men and women, gonorrhea doubtless is the most common. A married woman may thereby be rendered sterile in one of three ways.

Her husband may have acquired gonorrhea years before their marriage and, though himself cured of the disease and no longer infectious, may have lost the power of procreation on account of certain destructive effects which the infection in very many cases leaves in some parts of the male genitals. Thus, a woman may herself be perfectly healthy and yet be condemned to a life of barrenness because of the sterility of her marital partner.

Again—and this is the most frequent eventuality—she herself is infected by her husband. The latter may have honestly but mistakenly believed himself to have been cured, or he may be too ignorant or indifferent to care what happens to the wife. In either case, the course of events takes place which has been sketched in Chapter III. There is the burning

on urination, the irritation of the vulva, perchance accompanied by an abscess in one or both glands of Bartholin, the profuse, purulent discharge, the pain in intercourse; then, on slightest provocation, the infection very often ascends from the cervix into the uterine cavity and from there into the tubes. There follows the inflammatory swelling of the latter, the severe pain, the high fever; and as the pus drips out from the fimbriated extremity of the tube, a pelvic peritonitis is set up which renders the patient a seriously sick woman and, at the same time, produces an exudate which, in turn, seals up the fimbriated end. *It also seals up all hope of conception,* for now egg and spermatozoon can never meet.

Unfortunately, the picture is not yet complete. A young woman, heretofore in the best of health, is taken sick soon after marriage from a, to her, unintelligible cause, and troubled with loathsome symptoms. Very quickly, as we have just seen, there develops in many cases a most painful condition usually described by the laity as "inflammation of the bowels." From now on, though she does not yet know it, she will be forever barred from fulfilling her natural function in life, that of bearing children; and, futhermore, she is destined to a life of invalidism. Her sphere of usefulness and activity has suddenly become restricted. If she be a well-to-do woman, she may be able to adapt her life to altered circumstances. If she be a wage-earner, she will have to drag herself through her daily routine as long as her strength permits, but sooner or later she will have to submit to an operation which will cost her not only a part or all of her genital organs, but may also cost her life. And even though she recovers completely from the operation, yet she remains a disillusioned, disappointed, prematurely aged person who may be still further handicapped by the economic hardships, the expenses entailed, the absence from work, the loss of employment.

Sterility is not always produced by gonorrhea *at once.* In a great many cases it seems that conception and infection occur practically simultaneously, the former perhaps a very short time in advance of the latter. Or else, the woman, while pregnant for some weeks or months, acquires the disease. At any rate, the cocci find the entrance to the uterus blocked. There can, therefore, be no ascending gonorrhea, and preg-

nancy will continue undisturbed, except for a profuse and highly irritating discharge which we find extremely difficult to relieve. Delivery may take place normally and on time. Now the crisis is at hand; for even with greatest care and ingenuity on the part of the doctor and nurse, it is frequently impossible to prevent the rapid ascent of the gonorrhea during the puerperium. The germs find ideal conditions for extension in the genital organs after childbirth because all tissues become softer during pregnancy and because their resistance is lessened due to the many small wounds and bruises which occur in even the most normal delivery. This is the reason why so many young mothers with gonorrhea go through the same course of events described above for acute infections and with the same end result, that of sterility. Such women, then, will have one child, but no others—hence the term "one child sterility."

The child itself, as it passes through the infected birth canal, is in grave danger of gonorrheal infection of the eyes, the so-called "*ophthalmia neonatorum*," which, if untreated or only insufficiently treated, leads to blindness. It is claimed that in more than 90 per cent of the cases, blindness is due to this source. The treatment of this severe inflammation of the eyes belongs in the realm of ophthalmology and may be studied in text books on eye diseases. In our present discussion it suffices to point out that it is possible to guard against the occurrence of this infection. For this reason, there are laws in this and other countries demanding that in *every* case of childbirth a drop or two of a silver nitrate or other specified antiseptic solution be placed in the conjunctiva of *every* newborn so as to prevent ophthalmia, and threatening punishment to any doctor or nurse who is found culpable of neglect. That, unfortunately, this precaution is not always observed and that the preventive treatment is often given carelessly, is shown by the numerous cases of ophthalmia and by the steady stream of blind people of whom the community eventually has to take care in some way.

Over and above these demands on the community, the nation itself is affected by gonorrhea. For some twenty years or more a steady decline of the birthrate has been observed in many countries, notably, France, Germany,

England, and more recently the United States. A condition is developing which is viewed with great concern by experts and socially minded people who look into the future. This decrease of the birth rate has a great many different causes, many of which have nothing whatever to do with medicine. Among the medical causes, however, gonorrhea occupies a prominent place because of its disastrous effect upon the function of reproduction in men and women. The greatest asset of any nation is its children. Any factor that injures our children or reduces their number, strikes at the root of our national being; and in the measure in which gonorrhea in the wake of the World War has become even more prevalent than it was before, it represents a danger to the entire nation.

SYPHILIS

The baneful effects of syphilis are even more ramified. Here, too, the woman is, in most instances, the innocent victim; for it is a generally accepted fact that most men acquire syphilis before, most women after marriage.

In Chapter III we have described and depicted the local lesions of syphilis about the genital organs. We must now enumerate briefly the effect of the disease on the rest of the body. There is, for instance, the *syphilitic roseola*, that is, a skin eruption of red or reddish-brown spots or blotches, or a dissemination of small or large skin ulcers, called *papules*. These eruptions may also occur in various mucous membranes, for example, in the mouth. Often we encounter persistent redness and soreness in the throat, falling out of the hair, obstinate headaches, anemia, loss in weight and strength, and slight fever for which no other cause can be found. The menstruations are in some cases too profuse and protracted, while in others they may cease altogether.

Syphilis is the most deceitful of all diseases. It may appear in a thousand disguises and mimic most any affection. Sometimes it manifests itself only in the form of nervousness for which the patient seeks relief in vain, until the true cause is discovered. Sometimes it may appear as an apparently harmless stomach or bowel trouble or as backache or some disturbance in the joints.

In later stages its manifestations are apt to be more marked and characterized by deep-seated destruction of tissues. A familiar example is the breaking down of the bony structures of the nose, resulting in the so-called "*saddle nose*" (Fig. 72). The nervous system, too, is a point of attack, though more often in men than in women. The outcome is locomotor ataxia or a more or less extensive paralysis.

We may stop here a moment to point out that syphilis, while essentially a sexual disease, may also be acquired in other

Fig. 72.—Syphilitic saddle nose. (Collection of the Barnard Free Skin and Cancer Hospital.)

ways. Wherever a "port of entrance" offers in the form of the tiniest crack or abrasion, there an inoculation with syphilis may take place. For this reason, nurses who give gynecological care to syphilitics without due precautions to themselves, are in danger of infection, and may well heed the urgent advice given on page 54, to use *intact* rubber gloves as a routine *in all cases* since they may not be able to recognize syphilitic lesions as such.

The general public, too, would benefit by greater hygiene. The common drinking cup with its menace both of tuberculosis

and syphilis, has already disappeared in many places, and several enlightened church congregations have substituted the individual for the general communion cup. There is a voluminous literature on syphilitic infections other than by sex relations and therefore called extragenital. A striking instance is that recorded by Dr. Schamberg in Philadelphia.

A coterie of young men and women, varying in age from 16 to 22 years, gave a minstrel performance as a benefit. Following this, a party, and later a banquet, were given at which juvenile kissing games were indulged in. One of the participants, a young man of 22, had a sore on his lip, the nature of which he averred he did not know. Six young women kissed by him developed syphilitic chancres of the lip. A young man present at the affair likewise developed a chancre of the lip apparently from the virus deposited on the lips of one of the young women, for he did not come into contact with the original source. In addition, a young woman kissed by the offender at a third social function likewise developed an initial sclerosis, making in all eight chancres of the lip from the one source.

The function of reproduction is, as a rule, not affected, and sterility is not a common occurrence. But the effect on the progeny is so disastrous that, in the final analysis, it amounts to sterility. Such patients usually give a history of having had a long series of miscarriages or of stillbirths at full term or of premature deliveries of children dying soon afterward. As the virulence of the infection gradually abates in the course of years, living children may be borne, but these are healthy and strong only in a small minority of the cases. In most instances they are rather puny at birth and very apt to succumb to any accidental disease in infancy. Or, if they survive, their value as members of the human society is very questionable. These so-called "congenital syphilitics" are, physically and mentally, inferior to those who were born of healthy parents. It is no exaggeration to say that our jails, our penitentiaries, and our homes for the feeble-minded are peopled with individuals with inherited syphilis.

If we now let pass in review before our mental eyes the suffering of the individual, the loss of human lives, the deterioration of the race, the upkeep of criminals and of demented, we

can more clearly comprehend the menace of syphilis to society.

The picture of venereal disease in its various aspects is, indeed, depressing. Has it a legitimate place in a nurse's textbook? Is the nurse able in any way to affect or remedy the condition in the foregoing?

It seems to me that the answer to these questions is obvious. Venereal disease is due principally to the gratification of the sexual instinct and gains headway largely because of ignorance. The sexual instinct untamed is so strong that it does not reckon the cost. The more educated we are, the greater are the inhibitions. This is true of any emotion, and it is equally true of the sex urge. That the nurse may fulfill an educational mission in her field, is generally recognized. Well fortified with the facts as set forth herein, she may be able to open the eyes of many a girl whom the false modesty of our days has kept in ignorance as to the most important possibilities of her future life. Woman's natural destiny is to be the mother of healthy children. If this maternal instinct were in danger of being thwarted, would it not be better to be forewarned? In this sense, Truth can not be harmful; and if every nurse would disseminate this knowledge among her friends without exaggeration and adhering closely to facts, the day, let us hope, will not be too far distant when *prevention* of venereal disease will be carried on on the largest scale yet undertaken. Not by legislation which thus far has been disappointing, but because of popular insight, every girl contemplating marriage will demand of, and exchange with, her future husband a certificate of health which will include first and foremost the subject of venereal disease, but other communicable or hereditary ailments as well. Then the object of *eugenics*, that movement which looks toward the betterment of the race by the union of people healthy in mind and body, will be attained and the efforts of the many thoughtful men and women who have striven to this end, will be crowned with success.

CHAPTER XII

WHAT THE NURSE SHOULD KNOW ABOUT CANCER

Modern medicine aims first and foremost at *preventing* human ailments. As a result of this principle of prevention most communicable diseases have markedly decreased in frequency. One need only think of the fight against tuberculosis which has done away with the common drinking cup, put a ban on spitting in public, and has led a flood of air and light into hitherto hermetically sealed living quarters. The typhoid fever epidemics of former days have now practically disappeared in consequence of sanitary supervision of water supply and wholesale anti-typhoid vaccination. Regions which were once barred to tourists because of the lurking dangers of malaria or yellow fever, are now sought by large numbers of people in quest of health or recreation. Death in infancy from contaminated milk, and the toll paid yearly to the ravages of diphtheria are now, happily, so reduced that many more children than ever before pass safely through the most critical years of their existence.

These few examples may suffice to show that all along the line the subjugation of disease, that greatest foe of human happiness, has made most encouraging progress; and the results obtained have in no small measure been due to the spirit of helpful cooperation with which the people at large have entered into the efforts of the medical profession.

Unfortunately, certain diseases remain which have not yet been checked and even show a definite tendency toward a steady increase. Foremost among these is cancer.

It was the German gynecologist, Dr. Georg Winter, who, in 1900, first conceived the idea of enlisting the public in a fight against the progress of cancer by means of statewide educational propaganda. Five years later, when he was able to report unmistakable results from his efforts, the idea was eagerly adopted in many other places, first in Germany, then

in other countries. The fight became a universal crusade, and today there is no civilized nation in the world which does not wage a systematic warfare against cancer. In this country it is the American Society for the Control of Cancer in which the educational work is concentrated.

Not only because of her interest in, and knowledge of, medicine but also because her opinion is frequently asked by the laity, it becomes necessary for the nurse to familiarize herself with the things we know regarding cancer.

The public at large thinks of cancer as a crablike animal with claws and teeth which eats its way through our tissues. It is time to free ourselves of this naïve conception. The nurse knows from her studies in physiology that the human body is made up of untold billions of tiny units, called cells, just as a wall is made up of units, called bricks. There are very many varieties of cells, and under normal conditions they live in a well ordered arrangement, no cell encroaching upon another and no group or variety of cells growing in excess of any other group or variety and thereby disturbing the harmony of the whole.

Sometimes for reasons still unknown to us, some cells go on a rampage; they multiply rapidly and without limitation; they spread in every direction and destroy any cells that may be in their way, and eventually form some sort of an enlargement which we call a *tumor*. As we have seen in Chapter VI, there are various kinds of tumors. There is the inflammatory tumor which in reality is more of a swelling due to the action of infecting bacteria (page 38) and eventually may decrease and disappear. There is, further, the "benign" tumor produced by a true newgrowth of cells which, however, do not go on increasing without limitation nor kill other cells in their way. Finally, there is the tumor under discussion which, from its destructive qualities and limitless growth, is called "malignant" or "cancerous." A malignant tumor has still another quality which is not shared by any other form of tumor: it forms deposits in other, distant parts of the body by dissemination of some of its cells through the blood stream or lymph channels. These daughter tumors which in turn grow rapidly and destructively, are called *metastases*.

There are several varieties of malignant tumors or growths, distinguished largely by their structure as revealed by the

microscope. Some are called "carcinoma," others "sarcoma," and there are yet others with which we need not concern ourselves here. For practical purposes it will suffice to group all kinds of malignant newgrowths under the name of cancer and to remember that the characteristics of any cancer are its rapid and limitless growth, its destructive qualities, and its ability of forming metastases.

A malignant tumor may be on the outside and visible, or hidden in the depth of the body. When it first becomes perceptible, it need not be larger than a millet seed, and in the very beginning it will merely be a matter of chance to discover it, because in this early stage it looks perfectly harmless and causes no pain or other symptoms. In every case, however, this enlargement will sooner or later break down and turn into an open sore or ulcer which resists all the ordinary methods of treatment and steadily increases in size and depth. Then it is that bleeding will occur, in some cases slight at first but increasing in time, in others abundant from the very first. Between such irregular hemorrhages there may be a copious discharge, often enough of an offensive odor. Gradually, pain will be felt, perhaps only indistinct and dull in the beginning, but becoming sharper and sharper every week until it is altogether intolerable. At the same time the patient's general health begins to suffer. There is loss of weight and strength, the color of the face fades, the skin becomes dry and wrinkled, and the sleepless hours of the nights spent in pain, rob the eyes of their lustre.

It is not necessary to point out that death is the outcome in every case not properly treated, because cancer is so common a disease that there is hardly a single family in all the land in which such cases have not been observed. There is something infinitely pathetic about the end of such cancer patients. While no age is safe from cancer and even children are subject to certain forms of malignancy, yet, in the great majority of cases it is the man or woman of advanced years that is particularly apt to acquire the disease. They may have a long life full of hard work behind them and be in the very best of health and ready to enjoy a well-earned rest when they are stricken by cancer. Fortunately, loving sons and daughters may take care of the afflicted parents and discharge their filial duties and

debts of gratitude without fear for their personal safety, for *we know positively that cancer is not "catching,"* not contagious, that it cannot be carried from one person to another. The nurse may be very emphatic with this statement because not a single instance is known where a doctor or a nurse, both particularly exposed to such contamination, has acquired cancer in the course of professional duties.

The nurse can also do much to dispel the fear of inheritance of the disease which haunts the lives of many people. While recent investigations make it seem probable that cancer is inherited in mice, no scientific proof as yet exists to show that this is true of man or that cancer is handed down from one generation to the next.

What the patient, what the patient's family should know first and foremost, is that cancer is not at all the hopeless disease which it was only a few years ago. There are three methods of treatment—and only these three—namely, surgical operation, radium, and *x*-ray. Each of these methods is suitable only for a definite kind of case. No two cases are alike, and only an experienced physician can tell which of the three methods would be best suited in a given case. But even the most experienced physician would be unable to do much for his patients unless they came under his care early, before the cancer had grown too far.

This means that treatment is promising only in the earlier stages of cancer, and that we must bend every effort to discover the disease in its beginning if we wish to check the further progress of the scourge.

Fortunately, there are some danger signals which, if only heeded by patients, would quickly reduce the large number of neglected and therefore hopeless cases.

A sluggish sore anywhere on the surface of the body which shows no tendency towards healing within a week of its first appearance, is suspicious of cancer and should have medical attention. Any thickening or swelling, for instance, in the breast, which the patient can feel or see, is abnormal and should be examined by a doctor. Continuous indigestion with or without vomiting, may camouflage a cancer of the stomach or intestines. Blood in the urine may be the first sign of cancer in the bladder or kidneys though, of course, it may be

produced by other less serious causes; yet, only the physician can make the diagnosis.

It is with regard to cancer of the genital organs, and chiefly that of the womb, that the nurse should be particularly well prepared to answer questions. Women are so accustomed to periodical bleeding that they are apt to become indifferent to its occurrence unless it happens to be painful. On the other hand, bleeding, as we have seen, is the first manifestation of cancer; and while the disease is most prevalent in the fourth or fifth decade of life, no age is exempt. The logical conclusion is that any abnormal bleeding whether too copious, too protracted or occurring too often, should be investigated thoroughly by a physician *without waiting for the bleeding to cease.* The false idea that a bleeding woman is "unclean" and cannot be examined, which has come down to us through the ages, has been responsible for innumerable cases of disastrous delay. Surely, one would not let a wound on the arm or chest bleed without investigating the cause at once.

The nurse has frequent opportunity to put a stop to other popular misconceptions. The laity is under the impression that the change of life is always ushered in by hemorrhages. While it is true that bleeding occasionally occurs at this time, it should be emphasized that the *normal* menopause is characterized by a gradual fading of the menstruation in the sense that the periods become less frequent; less profuse and less prolonged. Any departure from this normal type should call for an examination. If bleeding occurs some time after the climacterium has once been established, women are apt to think that "the menstruation has returned." The nurse should vigorously oppose such an idea. Appearance of blood, no matter how scanty, at that time is abnormal and most often, though by no means always, suggestive of cancer.

What has been said of bleeding, applies with equal force to any unusual discharge from the vagina and demands expert examination. The foul odor which in the mind of the people is associated with cancerous discharges, is absent at first and occurs in the later stages of the disease.

Never should examination or treatment be postponed because the patient has no pain; for in the early stage when the patient can still be cured, there is no pain. Nor is there

any loss in weight; and, in fact, a patient may present the picture of perfect health and yet be the bearer of a very early cancerous condition. When pain, and pallor, and loss in weight and strength have made their appearance, the disease, as a rule, is so far advanced that permanent cure is no longer likely.

If any of the signs and symptoms described in the foregoing, should be noticed, a physician experienced in, and well equipped for, the treatment of cancer should be consulted at once, or the family physician should be requested to refer the patient to such an expert; and the advice of the medical authority should be carried out without delay.

It has been argued with some reason that by wide publicity to the subject, much unnecessary and exaggerated fear, a sort of cancerophobia, is created in the mind of the laity. Would it, on the other hand, be better to leave the people in ignorance and let them drift into grave dangers without warning? If every suspicious case is investigated at once, the physician may either find that there is no cancer present and thus relieve the patient's mind from all further anxiety; or else he may find an early case of cancer, and by applying proper treatment at once, he may restore the patient to health.

Our present modes of treatment are far from perfect and depend for their effectiveness largely upon the earliest possible detection of the condition. Let us hope that in the not too far distant future the cause of cancer will be discovered and with it a more certain method of cure. In the meantime, we must concentrate our efforts on recognizing and getting at cancer in its beginning, and in this undertaking the nurse can play a most important part.

PART II

Gynecological Nursing

CHAPTER XIII

EXAMINATION

It is the duty of the nurse to render conditions convenient to the doctor and to reduce the patient's discomfort as much as possible.

EXAMINATION IN OFFICE OR HOSPITAL

1. **Abdominal Examination.**—The patient lies on an examining table or chair on her back in such a way that head and shoulders are raised on a pillow while the knees may be slightly flexed. This secures a desirable relaxation of the abdominal muscles. Bladder and rectum should be empty. If the patient has been unable to void, the nurse should inform the physician of that fact. All constricting bands should be loosened, and the abdomen be bared from the ribs to the pubes. The chemise is pulled up or a union suit is slipped down from the shoulders, for even the thinnest kind of underwear would interfere with the examination. A sheet thrown over the legs and knees satisfies the natural demands of modesty.

The abdominal examination consists of

(*a*) *Inspection.*—This will reveal whether the abdomen is flat, caved in or, on the contrary, prominent. If the latter, the form, shape, and location of the distention will give the doctor valuable hints. Scars from former operations, visible movements, striae, that is, stretching of the skin caused by previous pregnancies, discolorations, skin eruptions, etc.—all these details are of significance in arriving at the correct diagnosis.

(*b*) *Palpation.*—By touching the skin with his hands, the physician may be able to make out abnormal conditions with-

in the abdomen (Fig. 73). If this manipulation causes pain or if the patient is apprehensive of being hurt, she will hold her muscles too rigid and thus defeat the purpose of the examination. The nurse can be of real help here. If she encourages the patient and diverts her attention by conversing with her, the needed degree of relaxation may be secured. Every doctor will appreciate the assistance of such a "mental anesthetist."

(*c*) *Percussion.*—This method of tapping the abdomen with one's fingers supplements palpation and allows one, by

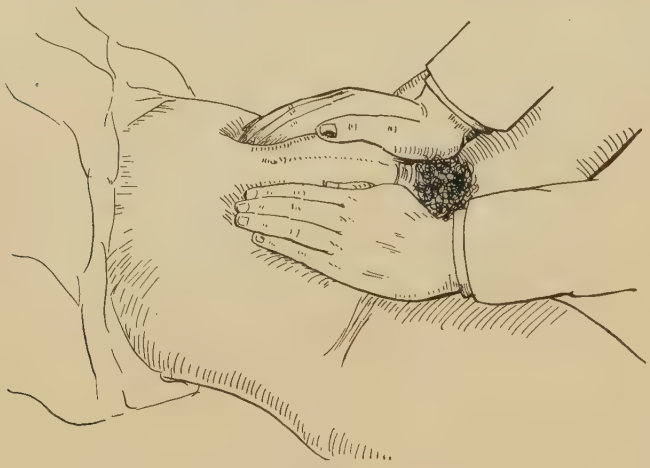

Fig. 73.—External palpation of the abdomen.

the quality of the sound elicited, to distinguish between various causes of abdominal distention such as tumors, gas, or water.

(*d*) *Auscultation.*—Listening for sounds within the abdomen through a stethoscope is most often used where the question of pregnancy is involved.

2. **Pelvic Examination.**—The patient is now moved toward the end of the examining table so that the buttocks are about an inch beyond the edge, and the feet are placed in upright leg-holders (Fig. 74) or, far better, on foot rests; the latter should be arranged in the manner indicated in

Fig. 74.—Posture of patient with feet supported by leg-holders. (Ashton.)

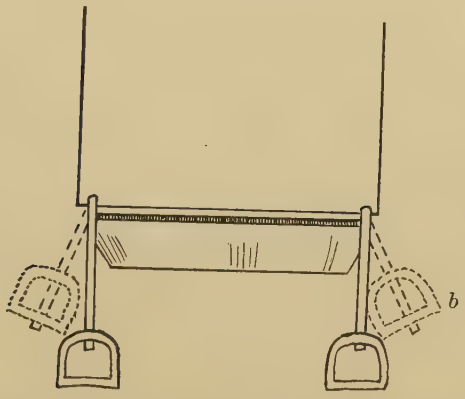

Fig. 75.—Foot-rests on examination table. *a*, Correct position. Note that the supports are parallel to each other, and that the foot-rests are at the very ends of the supports. *b*, Incorrect position. The supports are diverging, and the foot-rests are placed too near the table. This puts the patient in an uncomfortable and strained position.

Fig. 75 *a*, to allow for the maximum of comfort, and hence secure better relaxation. The knees are held widely separated and should be supported by the nurse so as to prevent fatigue. The patient is draped so that only the vulva remains exposed. Sufficient natural or artificial light must be secured. *The vulva should not be washed nor should a vaginal douche be given*, for it is obviously of great importance for the examiner to know the actual condition of the genitals. The amount of blood, the quantity and quality of any discharge present may have a particular significance. As to bleeding, it is not customary to examine a patient during menstruation. That the latter absolutely forbids an examination is, however, an exploded theory. On the contrary, it is at times particularly desirable to examine a patient *while she is bleeding*. This refers, for instance, to submucous fibroids (see page 78) which in some cases may only be felt during menstruation. Again, it would be a great mistake in a case of cancer of the uterus to postpone examination until bleeding has ceased, for the delay may prove disastrous (see page 134).

The pelvic examination includes

(*a*) *Inspection.*—This enables the examiner, as already mentioned, to observe the presence or absence of any natural or abnormal discharges. At this stage (or later) he may wish to obtain a smear for microscopic examination. For this reason, the nurse should provide a swab and one or two glass slides. The doctor will, further, note the condition of the external genitals and may discover tumors, ulcers, old or new tears, relaxations, hemorrhoids, etc. Before proceeding to the next step, he may wish to clean the vulva and require a basin with an antiseptic (lysol, bichloride) solution and some cotton sponges.

(*b*) *Digital Examination.*—The insertion of the *gloved* fingers (*digit*, latin for finger) into the vagina calls for a lubricant. *Vaselin should never be used;* it ruins the gloves and, being deposited in the vagina, renders the proper appreciation of any vaginal discharge impossible. Liquid soap, glycerin or any of the jellies on the market make good lubricants.

A very satisfactory, *sterile*, and colorless lubricating jelly which the nurse can prepare herself at very small cost, contains the following ingredients:

Menthol	0.3 (gr. 5)
Powdered tragacanth	14.0 (oz. $3\frac{1}{2}$)
Glycerin	225.0 (oz. $7\frac{1}{2}$)
Water	225.0 (oz. $7\frac{1}{2}$)

In a *dry* glass or enamel container mix the entire amount of tragacanth thoroughly with about half the glycerin until the mixture is free from larger particles. Then add the rest of the glycerin and, lastly, the water, keeping the mixture well stirred all the while. Now boil the mixture to proper consistence. When nearly cooled after sterilization, add the

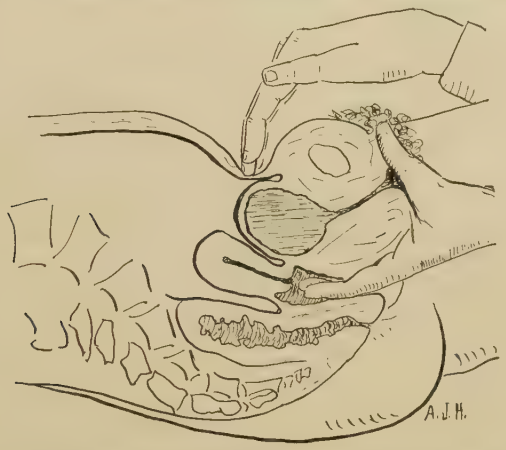

Fig. 76.—The distended bladder interferes with examination.

menthol dissolved in 10 cc. of alcohol. The entire mixture is now poured into *six* collapsible tubes which have previously been sterilized by boiling. It is a great time saver to double or triple the amount at one cooking.

Digital examination permits the examiner to feel the condition of the vaginal walls and cervix, to detect scars or tears, tumors or other anomalies, to recognize abnormal pulsations, etc.

(*c*) *Bimanual Examination.*—By placing the other hand upon the lower abdomen, the physician now determines the condition of the pelvic organs between his two hands (*manus*, latin for hand). It becomes obvious at once why, in this examination, the bladder must be emptied beforehand. If

this is not the case, the condition depicted in Fig. 76 obtains; that is to say, a bag filled with water dislocates the pelvic organs and is interposed between the hands of the examiner. Compare this illustration with Fig. 77 after the bladder has

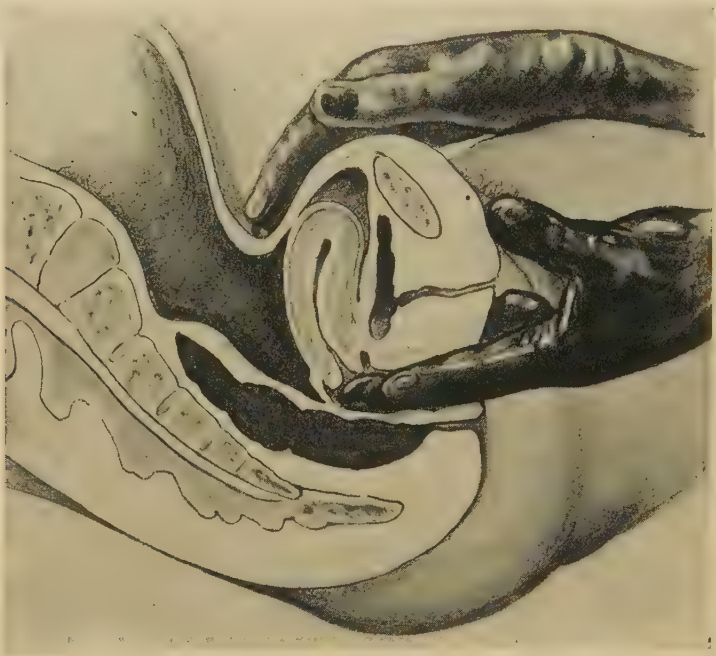

Fig. 77.—Bimanual examination. (Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

been emptied. The uterus now lies in its true position and the examiner can obtain a good mental picture of the conditions in the pelvis. The finger in the vagina has aptly been called the eye of the gynecologist. By means of it, and with the help of the hand on the outside, he can *see* what is actually hidden from view.

It would also be desirable to empty the rectum beforehand because stools in the rectum encroach upon the space in the vagina and distort the position of the pelvic organs; but this advantage is not always obtainable at the first examination.

(*d*) *Combined Rectal Examination.*—Sometimes the examination with one finger in the rectum, the other in the vagina yields very valuable information, provided the rectum is empty. (Fig. 78). In virginal patients the examination with one hand on the abdomen and one finger of the other hand in the rectum takes the place of the bimanual examination.

Fig. 78.—Combined rectovaginal examination. (Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

(*e*) *Speculum Examination.*—In all patients except those with intact hymen, an examination through a speculum is necessary. A speculum is an instrument by which the vagina can be unfolded and its interior, including the cervix, be made visible. The speculum most commonly used is the "bivalve speculum" of Graves (Fig. 79).

The speculum prior to its insertion, is lubricated only on its outside lest the reflecting inside of the blades becomes dull. The speculum of which two sizes should be at hand, should be boiled after use and then kept in a clean basin, protected from dust. A dressing forceps, curved or straight, (Fig. 80) should likewise be handy to wipe out the vagina with cotton balls or

gauze sponges if necessary. If, for any reason, a tenaculum (Fig. 81) be needed to pull down the uterus, this instrument would require boiling *before* use.

3. **Examination in Sims' Position and Knee-chest Position.**—Occasionally, examinations in positions other than the two described in the foregoing are made. In the *Sims' posi-*

Fig. 79.—Bivalve speculum in place. (Bandler.)

tion, the patient lies on her left side (or the right if better illumination is from that side). The left leg is extended, the right leg strongly flexed in the hip joint (Fig. 82). The left arm and hand are brought out behind the body, so that the patient rests almost on her chest. A sheet covers the entire body with the exception of the buttocks. The nurse gently lifts up the right buttock whereby the vulva is exposed. Thus, the condition of the perineum, for instance after a perineal operation, or of the anus can well be observed and necessary treatment given. The physician now inserts the Sims' specu-

Fig. 80.—Dressing forceps.

Fig. 81.—Tenaculum.

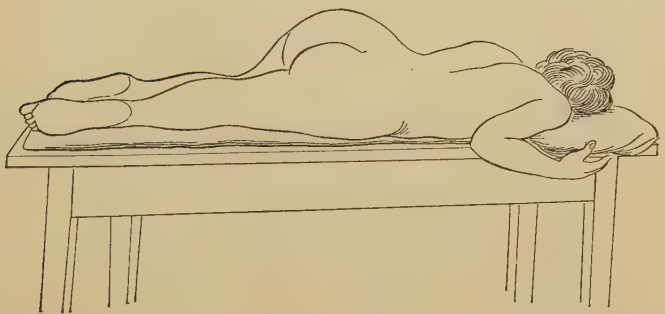

Fig. 82.—Sims' position. The sheet which covers the body and leaves only the buttocks exposed, is omitted in order to show the arrangement of legs and arms more clearly. (Ashton.)

lum (Fig. 83) into the vagina. By pulling the perineum backward, air rushes into the vagina and unfolds the latter so that a good view of the interior of the vagina is obtained.

Fig. 83.—The use of the speculum in Sims' position. (From Kelly, "Medical Gynecology," published by D. Appleton and Co.)

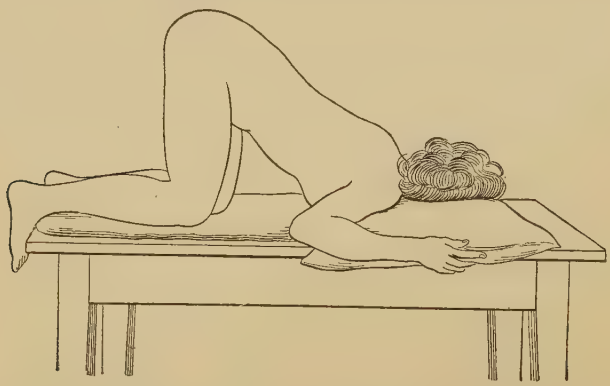

Fig. 84.—Knee-chest position. Note the curve of the spine, without which the position is incorrect and uncomfortable. (Ashton.)

Both this position and the particular speculum used are named after Dr. J. Marion Sims of Montgomery, Alabama, of whose ingenuity we have spoken on page 73.

The nurse must also be familiar with the *knee-chest position* (Fig. 84). Have the patient kneel on the well padded table, with the knees far apart, and lower her chest on a pillow. The head is turned to one side, so as to allow of easy breathing, while the arms are kept in any comfortable position. The knee-chest position is needed in gynecology only occasionally but finds a more extensive use in obstetrical patients, particularly in the puerperium.

EXAMINATION AT HOME

This will never be quite as satisfactory as an examination under the more favorable circumstances of the office or the hospital; yet, it may suffice in an emergency or where the patient is too sick to be moved.

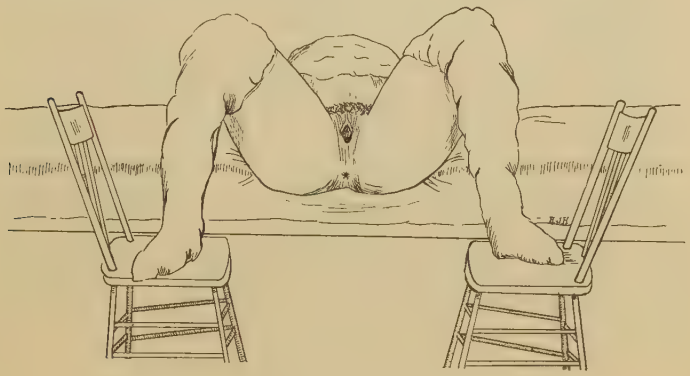

Fig. 85.—Cross-bed examination in the home.

For the abdominal and bimanual examination the patient need not change her position in bed, except that she is moved closer to the edge of the bed where the examiner is seated. For the speculum examination, the cross bed position is needed, that is, the hips are brought to, and a little beyond, the edge of the bed, while the feet rest on chairs (Fig. 85). The "partial cross-bed" position (Fig. 86) may be used where the patient is very ill; in such a case, the speculum would probably be dispensed with so as to spare the patient any unnecessary pain. The draping of the patient in any of the positions mentioned can readily be done with bed linen and blankets.

The mattress and the edge of the bed, respectively, should always be protected by a rubber sheet (or in the absence of this, with newspaper) and towels.

Fig. 86.—Partial cross-bed position. (From Crossen, "Gynecology for Nurses," published by C. V. Mosby Co.)

QUESTIONS

1. How should the nurse prepare a patient for abdominal examination?
2. In what position should a patient be placed for vaginal examination?
3. Should a vaginal douche be given before examination? If not, why not?
4. Does bleeding absolutely forbid vaginal examination?
5. What articles should the nurse prepare for vaginal examination?
6. What are lubricants used for? Name some lubricants.
7. What is a bimanual examination?
8. Why is it necessary to empty the bladder before examination?
9. What is a speculum, and what is it used for?
10. What is the Sims position?
11. What are the cross-bed and partial cross-bed positions?

CHAPTER XIV

SPECIAL METHODS OF EXAMINATION

CYSTOSCOPY

Cystoscopy (derived from the Greek words *cystis*, the bladder, and *scopy*, the act of seeing) is the method of examination of the bladder by direct vision. This is carried out by means of a cystoscope. This instrument (Fig. 87) is a long

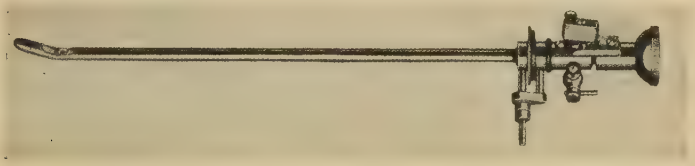

Fig. 87.—Cystoscope.

metal tube which, at its curved end, carries a small incandescent lamp. At the angle, there is a window and beneath it a small mirrow. Behind the latter a prism is so arranged that it throws the picture into the long axis of the instrument. Within the latter the picture passes through several lenses and is finally viewed through a magnifying lens at the outer end. Near this end there is a connection with the electric current to light the little lamp.

The following implements are required for a cystoscopic examination:

1. A basin with antiseptic solution and a few cotton balls;
2. a sterile catheter;
3. a glass graduate for the urine;
4. sterile glycerine for lubrication;
5. an irrigator filled with water. The ordinary hypodermoclysis outfit is quite suited for this purpose. A medicine dropper at the end of the long tubing serves to connect the

outfit with the catheter. The entire outfit must be sterilized before use. The water is sterile and of the temperature of the room, as the bladder, particularly when inflamed, is very sensitive to heat.

6. **The Cystoscope.**—The latter cannot be boiled. It may be sterilized by scrubbing it with soap and cold water and afterward placing it in a cool carbolic acid solution (1 per cent). Better still is sterilization by formalin fumes in a special metal box (Fig. 88) in which formalin tablets have been burned.

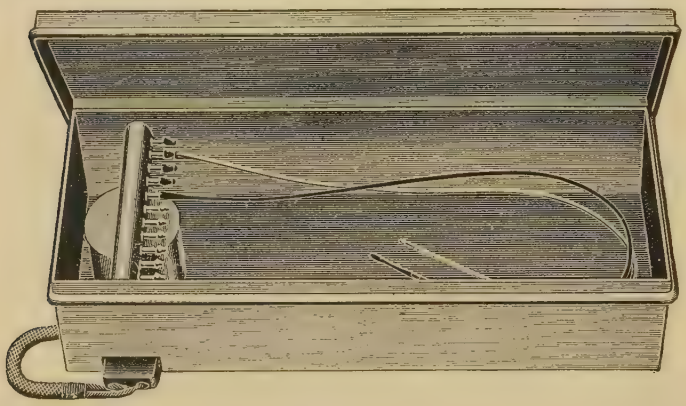

Fig. 88.—Metal box for formaldehyde sterilization of cystoscopes and catheters.

Cystoscopy, as a rule, is performed in the hospital or office on special examination tables. In the exceptional cases, where the examination is made in the home, the patient is placed across the bed, the hips well beyond the edge, the feet on chairs; a sheet of rubber or oil cloth protects the bed and leads into a bucket beneath. The nurse prepares the patient as for a catheterization.

The catheter is now introduced, the urine drained, and the bladder filled *slowly* until the patient complains of discomfort. The fluid is caught in the measuring glass, and if found cloudy the process is repeated until the water returns clear. Then the bladder is filled once more. The usual capacity of the bladder is 240 cc. (8 ounces); if 300 cc. (10 ounces) are tolerated, the

examination is a little easier; the smallest amount at which cystoscopic examination is still possible, is about 100 cc. (3 ounces). The patient should be urged by the nurse to breathe quietly and not to strain.

Now the cystoscope is introduced exactly as if it were a catheter; and if well lubricated with sterile glycerin, it will glide easily into the bladder without causing pain. When abnormal conditions produce pain on introduction, the examiner may use a local anesthetic or order hypodermic injection of morphine.

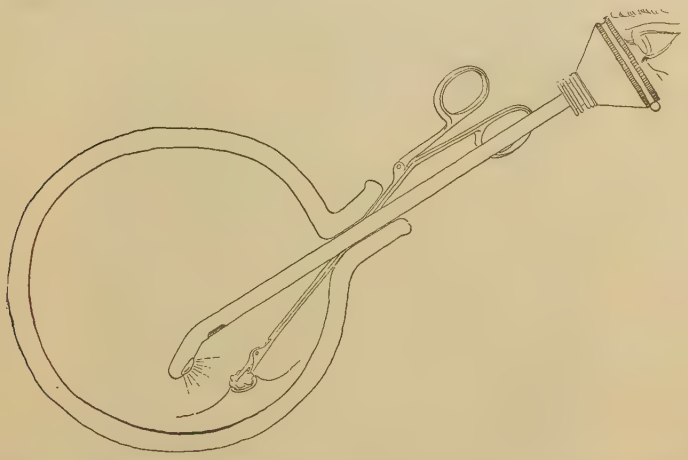

Fig. 89.—Cystoscopic examination. Author's case of removal of stone.

With the cystoscope in place, the physician is able to view the interior of the bladder (Fig. 89), to discover stones or new growths, to note the extent of any inflammation, to find ulcerations, to define the source of any bleeding, and to determine the quality of the urine flowing from the ureters into the bladder.

The examination of the ureters and the pelvis of the kidney belongs in the realm of urology.

PROCTOSCOPY

Examination of the inside of the rectum is called proctoscopy and is performed by means of a proctoscope (Fig. 90).

The rectum having been emptied by a cleansing enema an hour or two previously, the patient is placed in the Sims position (page 145), and the proctoscope, previously sterilized and well lubricated, is inserted by the doctor. If natural light is insufficient, the examination is made with artificial light and a head mirror. The nurse should have a number of swabs on long applicators handy, in case mucus or particles

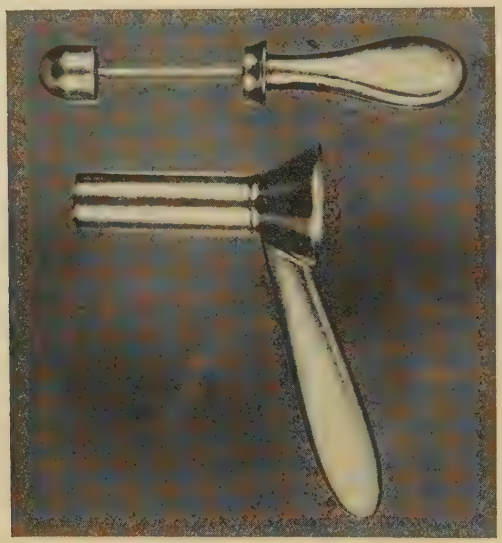

Fig. 90.—Proctoscope.

of stool have to be wiped out. Proctoscopic examination requires, as a rule, local analgesia with a five per cent cocain solution. It enables the physician to discover ulcers, hemorrhoids, strictures, fistulae, cancer, foreign bodies, etc., within the rectum.

THE RUBIN TEST

In 1919, Dr. Rubin, of New York, devised a method to test the patency of the Fallopian tubes in case of sterility. If the tubes are closed, it is clear that conception cannot take place. For this reason, it is of greatest importance, if a woman consults a physician because of childlessness, to

know whether or not the tubes are open, and consequently the Rubin test is widely employed by specialists and general practitioners. The nurse who assists at such an examination, should, therefore, have a conception of the principles of this procedure.

The apparatus consists of a thin metal cannula which, after sterilization, is inserted into the uterus. The cannula is connected by a rubber tube with a tank containing carbon dioxide, and there is a manometer which registers the pressure under which the gas flows through the cannula into the uterus and from there through the tubes into the peritoneal cavity (Fig. 91). If the free passage is blocked, that fact

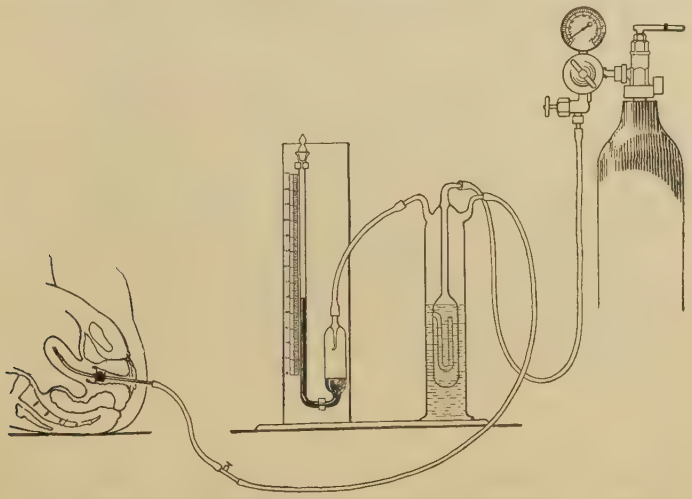

Fig. 91.—Rubin's apparatus for uterine insufflation to test tubal patency. (Rubin.)

becomes evident by a rise in the pressure gauge. If, on the other hand, gas enters the peritoneal cavity the patient experiences pain between the shoulders, thus demonstrating the fact that the tubes are open.

A good many modifications and simplifications of the original apparatus have been devised, and oxygen, nitrous oxide, and even air have been used for this "transuterine insufflation;" but the principle is always the same as in the ingenious procedure of Rubin.

Aside from gas, fluid may be injected into the tubes. The fluid used is a solution of sodium bromide or an iodized oil; both give shadows on *x*-ray photographs, and the interpretation of the photographic plate enables an experienced examiner to tell whether or not the Fallopian tubes are occluded (Fig. 92).

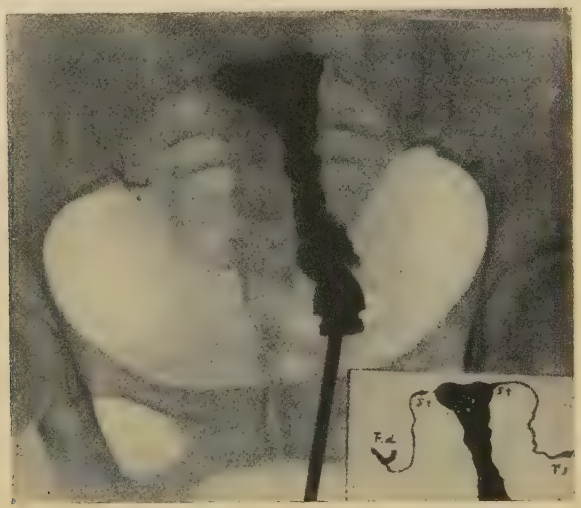

Fig. 92.—*x*-Ray picture of uterus and tubes after injection of iodized oil.

QUESTIONS

1. What is meant by cystoscopy?
2. What implements are needed for cystoscopic examination?
3. What can be accomplished by such an examination?
4. What is proctoscopy?

CHAPTER XV

CATHETERIZATION

Catheterization is the drawing off of urine from the bladder by a special tube called a catheter. Catheters are made of metal, rubber or glass.

Metal catheters have the advantage of durability, but they must be nickelplated from time to time because frequent boiling affects the smoothness of the surface. The accompanying photograph of such a catheter taken at random from one of the hospital wards not only demonstrates its lackluster appearance (Fig. 93), but under the magnifying glass one may also see

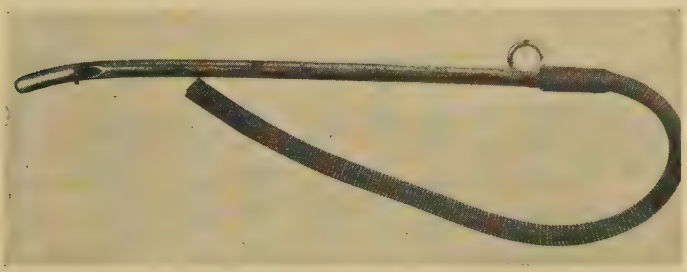

Fig. 93.—Metal catheter.

that the coating is worn off in many places (Figs. 94, 95). The little sharp scales render the surface so rough that the catheter on its passage through the urethra "sandpapers" its delicate lining. One can readily understand that the repeated use of such a catheter on the same patient might injure the mucous membrane, cause unnecessary pain, and prepare points of entrance to bacteria, thus engendering an inflammation of the urethra, a urethritis.

Rubber catheters are, probably, the best for general use. They are made in various sizes. The "16 or 18 French" is suitable for most cases. Larger sizes are impractical. For children or patients with very small urethral orifices smaller

sizes are required. The chief disadvantage of rubber catheters lies in the fact that they become too soft from frequent boiling; *in that case they should be discarded.* They must be wrapped in gauze or cloth when being sterilized lest the rubber suffer from boiling. In hospitals where many catheters must be kept

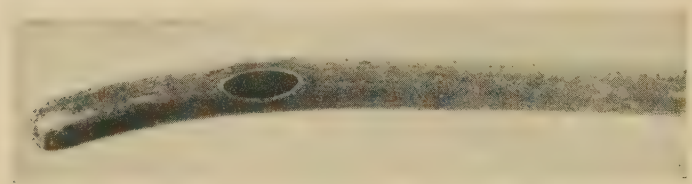

Fig. 94.—The same, seen through a magnifying glass.

sterilized for immediate use, it is best to lift them out of the instrument boiler with sterile forceps and keep them dry in a sterile container. Keeping them in a solution is inadvisable because of the effect of water on the rubber. Each time the lid of the container is opened, there may be a contamination

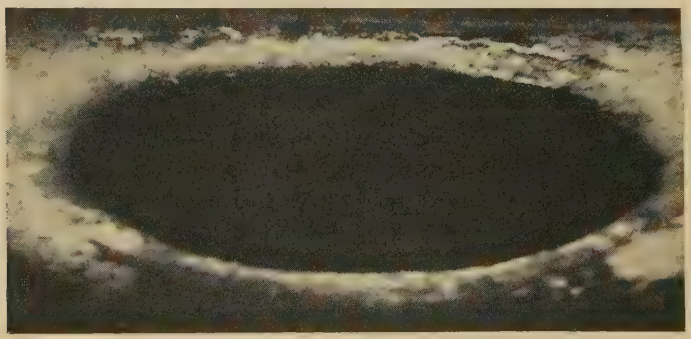

Fig. 95.—A still greater magnification, showing the immediate surroundings of the eye of the catheter.

of the remaining catheters, not with bacteria, but with moulds attached to dust particles in the air. Though this possibility is but slight, it is better to re-sterilize the container and catheters once a week.

Glass catheters (Fig. 96) have fallen into discredit because several instances of breaking off of catheters in the bladder

have been reported. This accident with its possible serious consequences is always the result of poor technique which could easily have been avoided. Only a catheter which is already cracked when introduced, can break off in the bladder; and such a crack may readily occur if the instrument is placed in boiling water without having been previously warmed. *It is, therefore, necessary to inspect the glass catheter carefully for breaks before use by holding it against the light.*

With this simple precaution which is to be repeated at each introduction and soon becomes automatic, the glass catheter is a perfectly safe instrument which has this great

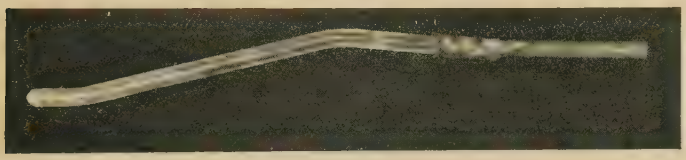

Fig. 96.—Glass catheter.

advantage over all other catheters that its surface always remains smooth and that it permits us to recognize at once when the bladder has been entered.

Catheterization is required for the following reasons:

1. *For chemical and microscopic examination* the urine must be free from any contamination with vaginal secretion or blood if the patient should be menstruating or bleeding from other causes.

2. *Before operation* the bladder must be empty as a full bladder seriously interferes with the operative work. Pre-operative catheterization thus is a part of proper pre-operative technique, but this applies only to laparotomies, because in vaginal operations the surgeon usually prefers to catheterize the bladder himself.

3. *After operation* many patients cannot void for various lengths of time. Passing water while lying on the back is a habit which is not always readily acquired. In former years, catheterization was restricted as much as possible partly because the procedure seemed too complicated and often was too painful, partly because the *danger of infecting the bladder*, the so-called "catheter cystitis," loomed large. For

these reasons, catheterization was postponed for twelve, and even twenty-four hours, and every possible expedient used to promote spontaneous voiding (page 236). To-day we realize that it is much more harmful to permit the bladder to remain distended than to empty it with a catheter. Not only does the patient suffer a great deal of unnecessary distress, but the urine collected in the bladder for many hours undergoes the same changes that would take place were it left standing in a receptacle, such as a chamber pot; that is, the salts would sink to the bottom and form sharp crystals, and the entire fluid would be affected by ammoniacal decomposition. The result might be a serious irritation of the bladder, the very outcome which we had been trying to avoid. Moreover, it is quite conceivable, that an overdistended bladder might unfavorably affect our operative results in the pelvic cavity.

Catheterization, on the other hand, gives the patient immediate relief, forestalls all complications, and causes no danger of infection, if done skillfully. It must be borne in mind, however, that there are *normally* bacteria in the urethra, and that the catheter always introduces a few of these into the bladder. To prevent these from multiplying in the bladder and causing a cystitis, the bladder should be irrigated at the end of every catheterization. The irrigating fluid serves to wash out the bacteria mechanically and to render harmless those that are left behind. For this purpose, a 2 or 4 per cent solution of boric acid is the one in popular use. I am, however, convinced that boric acid has not enough antiseptic property to be of any value; in fact, I have been able to grow bacteria in such a solution. For this reason, I recommend instead for routine irrigation after catheterization a solution of silver nitrate 1:3000. This solution must be prepared with *distilled* water; it should be perfectly clear, and reasonably fresh, that is, not older than one week at most. Other solutions of silver salts (neosilvol, silver iodide, etc.) may be used; but silver nitrate is the most simple and effective of all preparations. Solutions for bladder irrigations must *not* be heated; the temperature of the room is the best.

About post-operative catheterization there is one pitfall which is often encountered by the nurse. The patient may void small quantities (1 to 3 ounces) at very frequent

intervals of from one-half to one hour; and the nurse may conclude that the patient empties her bladder. In reality, this is a case of overdistention where only a small quantity dribbles off. Catheterization will in such a case draw off a large amount of urine and immediately remedy the frequent desire to urinate.

4. *The treatment of bladder infections* requires catheterization followed by irrigation with a specific solution prescribed by the physician. In general, the stronger the solution, the smaller the quantity introduced into the bladder. For instance, while silver nitrate 1:3000 or even 1:1000 may be used in quantities of from 3 ounces to a pint, only 1 or 2 drops may be injected, if a 1 per cent solution had been prescribed. We then speak no longer of irrigation, but instillation. Other solutions frequently used for this purpose are: 2 per cent protargol (2 drachms), 10 per cent argyrol ($\frac{1}{2}$ ounce).

The *technic* of catheterization is as follows:

1. Assemble all necessary implements on a tray, namely,

(*a*) a sterile catheter, or better, two, in case of contamination.

(*b*) a sterile bowl with a weak ($\frac{1}{2}$ per cent) lysol solution, a solution of bichloride of mercury 1:1000, or one of cyanide of mercury 1:1000, containing a few pieces of sterile cotton; the solution should be warm;

(*c*) a bowl or "pus basin" for the soiled cotton, and a urine glass or sterile bottle;

(*d*) a small bowl containing 2 or 3 ounces of silver nitrate solution 1:3000;

(*e*) a bulb syringe of the "asepto" type, holding 1 or 2 ounces;

(*f*) a few sterile cotton balls;

(*g*) a sterile medicine glass with some sterile glycerin or oil.

(*h*) 2 sterile towels for draping.

2. Place the tray handy for use at the foot of the bed and secure good light, natural or artificial.

3. The patient lies on her back with the thighs flexed and well separated. Cover the legs with sheets and put sterile towels over these near the vulva, leaving the latter, however, exposed.

4. Scrub your own hands thoroughly with soap and water, dry them, and put a sterile glove on your left hand or sterile

rubber cots on your left thumb and index finger. In many hospitals sterile or bichloride soaked cotton pledgets are wound around these fingers, but these will neither substitute for rubber gloves or cots, nor will they protect you if the patient happens to have syphilitic sores or highly infectious bacteria about the vulva.

Fig. 97.—Sometimes the meatus can not clearly be distinguished from other grooves in its vicinity.

5. Separate the labia with the thumb and index finger of the left hand and expose the urinary meatus. *Do not change the position of your fingers until the catheter is in the bladder.*

6. Sponge the urinary meatus freely with the cotton pledgets from the antiseptic solution. *Do not squeeze out the pledgets.* It is not the cotton you want, but the solution. You cannot possibly disinfect the delicate mucosa, no matter

how hard you rub it, but by the rubbing you will hurt the patient and abrade the tender tissues. All you can expect to do is to wash off a certain number of bacteria around the urethral opening and weaken those that remain.

7. Hold the end of the catheter after having dipped it into the lubricant (or, if you use rubber catheters, about 3 inches

Fig. 98.—By upward traction the meatus is made to gap.

from the tip) delicately between thumb and index finger of the right hand, about the way you hold a pencil, and introduce the tip into urethra. *Be sure that the catheter touches nothing unsterile on the way from the sterilizer to the meatus, not even the mucosa outside of the meatus.* If you happen to touch the vulva, even $\frac{1}{2}$ inch from the meatus, boil the catheter again and repeat the procedure.

8. If you are not quite certain which of the several grooves or depressions in the upper part of the vulva is the urinary

orifice, (Fig. 97) make a slight upward traction with your fingers without letting go of your hold on the separated labia. The meatus will then appear as a triangular opening in the center of the field (Fig. 98).

9. Now push the catheter gently through the urethra and follow, with a slightly upward motion, the curve of the undersurface of the symphysis. Never should the catheter "be grasped firmly with the fist, as though the nurse were determined to overcome any obstacles encountered by main force, neither must it be pushed straight in, as though the urethra were a straight tube" (Kelly). A rubber catheter will, of course, find its own way.

10. The left hand leaves the labia and takes hold of the catheter as soon as urine flows into the urine glass. It is unwise to hasten the flow of urine by pressure above the symphysis, for when this pressure is released, aspiration of air is apt to occur. The right hand is now free to fill the bulb syringe with the irrigating fluid and to inject the latter into the bladder. The procedure is repeated once or twice, and the fluid is drained off before the catheter is withdrawn.

11. Sponge the meatus with soaked pledgets and finally with the dry sterile cotton balls.

Performed in this manner, catheterization is both harmless and painless. In fact, the nurse's technical ability may well be gauged by the ease with which she carries out this simple, yet very important measure.

THE RETENTION CATHETER

In some cases it may be desirable to prevent any accumulation whatever of urine and to secure a continuous and uninterrupted drainage of the bladder. This object is accomplished by leaving a "permanent" or "retention" catheter in the bladder.

Following are some of the conditions where this procedure may be indicated:

1. After certain abdominal operations, notably those for cancer of the uterus, where the bladder has been separated extensively from its surroundings, experience has shown that the bladder remains paralyzed until the severed nerve connections have been reestablished. The patient is unable to void at

all or can expel only a part of the contents of the bladder so that always some urine remains behind. Such patients must be catheterized as often as every six hours, but as the disability may last for one or more weeks, this frequent catheterization may give rise to discomfort, irritation, and infection. Permanent drainage through a retention catheter is, therefore, preferable.

2. After certain vaginal operations, particularly those where extensive repair or other plastic work was done about the vulva, the painfulness and swelling of the area involved usually interferes with spontaneous urination for several days.

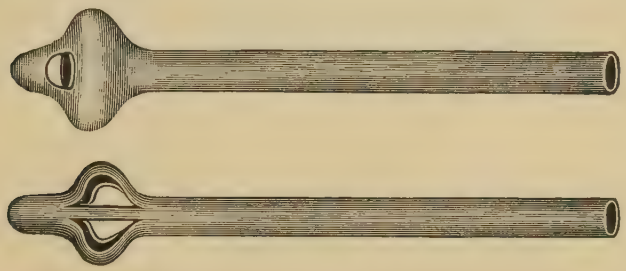

Fig. 99.—Forms of soft rubber retention catheters.

Catheterization is, therefore, required two or three or more times every twenty-four hours; and each time the nurse spreads the labia apart, she irritates the sutured tissues which, like every fresh wound, need absolute rest to heal. Even if the patient is able to void, the urine will run over the line of sutures and may cause irritation if not every trace of it is washed off by the customary pitcher douche (page 236). All possibilities of disturbance of wound healing are, however, eliminated if a permanent catheter is inserted. This also applies to the repair of extensive lacerations following childbirth.

3. If in the course of an operation, whether abdominal or vaginal, the bladder has been injured unintentionally and sewed up at once, it is imperative that the injured organ be put at rest; and this again calls for the permanent catheter.

4. After operations for vesicovaginal fistula (page 165)

the success of the operation usually depends on continuous drainage of the bladder through a retention catheter.

5. In very severe cases of inflammation of the bladder which resist the usual methods of treatment, comfort and cure may be obtained by means of the permanent catheter.

These permanent or retention catheters may be obtained in several forms, namely the mushroom catheter of Pezzer

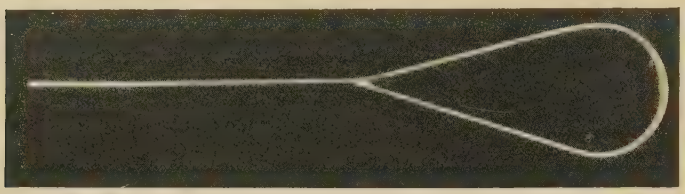

Fig. 100.—Stylet for introducing rubber retention catheters. A uterine sound will serve as a makeshift.

or similar models (Fig. 99) and the horsehoof catheter designed by Dr. Skene, of Brooklyn. The first are of rubber and should be of size 10 or 12, French scale. They are introduced well lubricated and by means of a stylet (Fig. 100), a stiff wire with rounded tip; in the absence of the latter, a uterine sound may be used. Skene's catheter is made of glass and has a

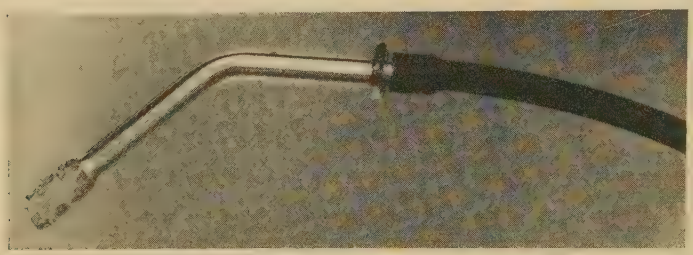

Fig. 101.—Skene's "horsehoof" catheter.

small rubber tube attached to it (Fig. 101). Personally I prefer it to the other retention catheters for the same reason why ordinary glass catheters seem to me superior to rubber catheters.

It evolves upon the nurse to carry out the simple but most important technique painstakingly so as to derive the desired result from permanent catheterization.

The patient lies on her back; the knees are separated and rest on bolsters or rolled pillows. The end of the retention catheter dips into a male urinal; or else it may be connected with a longer rubber tube which leads into a bottle by the side of the bed. In the latter case prevent a pull on the retention catheter lest you pull the latter part way out or exert pressure on the bladder neck (Fig. 102).

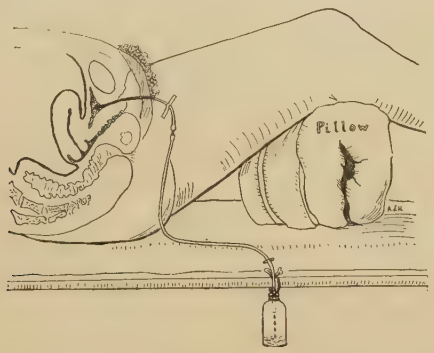

Fig. 102.—The retention catheter in place. Note that undue pull on the catheter is prevented by means of adhesive plaster and safety pin.

Every four hours day and night empty the urinal or bottle and measure the amount of urine; and at the same time inject two or three bulbfuls of silver nitrate solution 1:3000 into the bladder. In this manner the danger of bladder infection is practically nil. A slight irritation of the bladder is not always preventable with rubber catheters because urinary salts settle on their tips and render them rough. The glass catheter of Skene is free from this disadvantage. At present writing such a catheter has been in a patient of mine upon whom a complicated operation about the vagina has been performed, for the last *five* weeks without causing the slightest trace of disturbance.

The bladder irrigation performed every four hours will not only prevent infection but also forestall blocking of the catheter. This is of obvious importance where a recent bladder injury or a fistula had been repaired. The success of such an operation, says De Lee, depends largely upon the nurse, because if she allows the catheter to be plugged with urinary

salts or to be kinked, the bladder will become overdistended, and, since the urethra is blocked, the urine will find exit through the stitches, thus spoiling the operator's best work.

In the case of severe infections, the attending physician may order more frequent irrigations with specific solutions.

EXAMINATION OF URINE

The nurse will, as a rule, not be required to examine the urine chemically and microscopically. This duty is usually left to interns or laboratory assistants. For this reason, detailed instructions are here omitted and the reader is referred to special works on laboratory technique.

It is, however, expected of the nurse to put down in her bedside notes not only the amount of urine drained within a given period but to describe briefly some of the physical properties of the urine. Is it watery, light yellow, straw or amber colored, or a deep yellow; or is it bloody in appearance? Is it clear, hazy or cloudy? Does it contain a few or many small or large flakes, or other constituents such as necrotic tissue particles? Is there a sediment, and is this sediment white, yellowish, or "brick dust" in appearance? Is the odor of the ordinary kind or unusually strong or ammoniceal? These observations on the part of the nurse may be of material help to the physician in the management of the case.

QUESTIONS

1. What is a catheter? Of what three materials are catheters made?
2. How can you prevent the breaking off of a catheter in the bladder?
3. What are some of the reasons for catheterization?
4. What articles do you need for catheterization?
5. How do you prepare the patient and yourself before performing catheterization?
6. Describe the steps of technic.
7. How can you make the meatus visible, when in doubt as to its exact location?
8. What are the dangers of catheterization?
9. What is meant by irrigation and instillation of the bladder?
10. What solutions are commonly used in either procedure?
11. What is a retention catheter?
12. What is the care of a patient in whom a retention catheter is inserted?
13. What are some of the reasons for using a retention catheter?
14. Name some characteristics of abnormal urine to be recorded by the nurse in her bedside notes.

CHAPTER XVI

ENEMA

An enema is an injection of fluid into the rectum. It is required for a rather large variety of purposes and accordingly classified as cleansing, laxative, nutrient, and stimulant.

CLEANSING ENEMA

The cleansing enema is given with plain water, normal saline solution or soap suds at a temperature of from 100 to 105 F.; the amount of water needed varies from 1 to 4 pints. The necessary apparatus consists of a "fountain syringe" which is found in most households or, preferably, a "douche"

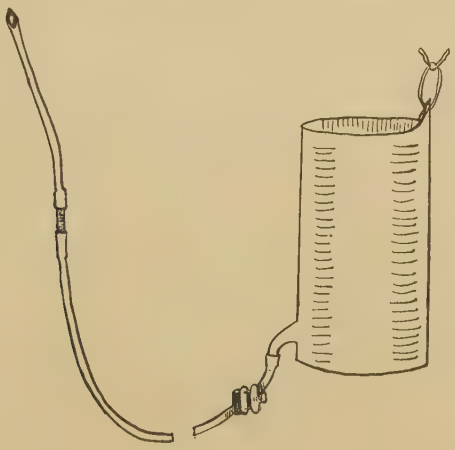

Fig. 103.—Enema can with rubber catheter.

or "enema" can of enameled ware. A rubber catheter, not too soft from frequent boiling, should be slipped over the tip of the enema outfit (Fig. 103). The patient lies on her left side. The nurse lifts the right buttock and while the patient strains downward, thereby relaxing the anal sphincter, inserts the well lubricated catheter a finger's length into the rectum under

guidance of the eye. At this point it will be useful to remember the anatomy of the rectum and to realize (Fig. 3) that in the recumbent position the anal canal extends *upward* for an inch and a half before it opens into the roomy part of the bowel, the so-called *ampulla recti*. It is clear that the catheter must be introduced in an upward direction. The size of the catheter should be 16 or 18 French scale, as a larger tube causes unnecessary pain, particularly if enemas have to be given repeatedly or if the anal opening is narrowed by hemorrhoids or irritated by a fissure (page 120). The advantages of the catheter over the stiff tip are too obvious to require any comment. It has been assumed that one can give a "high" enema by inserting the entire length of the catheter into the rectum. This is a fallacy because the catheter will not pass the overhanging promontory of the sacral bone but be kinked or coil about itself in the ampulla.

The enema fluid should be allowed to flow into the rectum very slowly by raising the can at the most 1 foot above the patient. Soon after the water begins to run, many patients complain of cramps and urgency to move the bowels. This is due merely to a reflex contraction of the rectum. If further inflow is checked for a minute, this sensation subsides and the full amount can usually be given without difficulty. The patient is instructed to hold the water in the bowel as long as possible.

After use, the catheter must be rinsed off or cleansed mechanically of fecal matter, and the entire outfit boiled in a deep basin. If a fountain bag has been used, be sure to wrap the whole apparatus in a towel before immersing it in water so as to preserve the rubber. The outfit may then, protected from dust, be kept for the next time.

COLONIC FLUSHING

This is a form of cleansing enema by which the evacuation of the entire large bowel is attempted. The procedure requires a douche can to which a long colon tube of moderate size is attached. The patient lies on her left side with the buttocks a little over the edge of the bed, the latter being protected by a rubber sheet. A bucket is placed near; likewise a large pitcher with warm saline solution. The nurse gently intro-

duces the lubricated end of the colon tube, instructing the patient to bear down so as to relax the anal sphincter. The solution is permitted to run in slowly until the patient complains of discomfort. The nurse then lowers the can to the floor, allowing the water with dissolved fecal matter to run back through the container into the bucket. After refilling, the raising and subsequent lowering of the can is repeated until the water returns almost clear. The nurse may now inject another pint which is to be retained. The entire procedure occupies about one hour.

LAXATIVE ENEMA

The solution for laxative enemas is usually specified by the physician. Normal saline or soap suds are commonly used. In chronic constipation, an enema of six ounces of mineral oil, introduced at bed time and held in the bowel all night, is often recommended. A bath towel under the buttocks will protect the bed against leakage while the patient is asleep. After operations, enemas of three or more ounces of a saturated solution of magnesium sulphate very often give satisfactory results. Another formula is:

Saturated sol. of magnes. sulph..... 1 oz.
Glycerin..... 2 oz.
Water or soap suds..... 3 oz.

or:

Saturated solut. of magnes. sulph.....
Mineral oil (thoroughly mixed).....āā. 3 oz.

For postoperative tympanites (page 244) turpentine or ox gall are at times prescribed as ingredients where defecation seems especially difficult to accomplish. This is the case particularly after operations when the distention of the abdomen may be most distressing and even dangerous. In preparing a turpentine enema, the nurse must mix the turpentine (1 to 2 drachms) thoroughly with 1 pint of soap suds (105 F.) before injection. Another method is as follows: Mix 2 drams of oil of turpentine well with 3 ounces of warm olive oil, cotton seed oil or mineral oil. Let this oily mixture run first into the rectum and follow it up with a soap suds enema. If the oil and turpentine were put into the enema bag with the water, they would float on top of the water and never get into the rectum.

The formula for the oxgall enema is:

Ox gall	2 drams
Glycerin	4 oz.
Warm water	1 pint

SOOTHING ENEMA

It happens at times that purgative enemas, repeated rather frequently within the space of a day or two, set up a marked irritation of the large bowel which manifests itself in profuse diarrhoeas. As in most such cases the patients had been operated upon but a few days previously, this causes considerable distress and prostration. Quick relief is given by a 4 ounce-*starch enema*, made by boiling corn starch to the consistency of cream and introduced at a temperature of 100 F., with the addition of 10 drops of tincture of opium. This enema is to be retained.

NUTRIENT ENEMAS

There are certain conditions when it is desirable to withhold all food by mouth and to resort to rectal feeding by means of enemas in order to keep the patient alive. The usefulness of nutrient enemas, however, is restricted, first, by the rapidly developing irritability of the large bowel, and secondly, by the fact that the rectum can absorb only a small amount of food. Hence such enemas can be given only for a limited period of time and should contain only the most readily assimilable and least irritating substances. The simplest ingredients are milk, eggs, sugar, and salt. The milk should be skimmed (because fat is not absorbed by the rectum) and predigested by addition of a small quantity of pepsin or pancreatin.

Formula 1.	Granulated sugar	2 oz.
	Milk	8 oz.
Formula 2.	Milk	8 oz.
	Yolk of two eggs	
	Pinch of salt	
	Starch or flour	½ oz.
Formula 3.	Pinch of table salt	
	One raw egg	
	Beef juice	2 oz.
	Milk	2 oz.
Formula 4.	One raw egg	
	Milk	3 oz.

Before the first nutrient enema a cleansing enema of salt solution should be given, and this is repeated before every third feeding. The enema should be given by the drop method (see below) and the temperature should be maintained at 100 F. It may be repeated every 4 or 6 hours, and if signs of rectal irritability develop, 10 or 15 drops of tincture of opium should be added to the mixture.

STIMULATING ENEMAS

These are given when the waning strength of the patient is to be restored quickly. A suitable mixture is 1 pint each of hot normal salt solution and strong, black coffee; or the following formula:

Ammonium carbonate	30 gr.
Whisky	1 oz.
Salt solution	1 qt.

Give at 105 F., and hold a pad against the rectum after injecting the enema. If the sphincter is relaxed, elevate the foot of the bed (Macfarlane).

PROCTOCLYSIS

The continuous influx of a large quantity of a watery solution, notably, normal salt solution, is termed "proctoclysis." It also is called the Murphy drip method, after the Chicago surgeon John B. Murphy, who introduced it into medicine. This procedure is used to restore the heat of the body in patients who have become chilled during an operation, to replace the body fluid in those who have lost a great deal of it by bleeding or vomiting, to intensify the patient's power of resistance in the presence of a weakening infection and to aid in the elimination of poisonous matter, to counteract the dangerous accumulation in the blood and tissues of harmful substances such as certain acids, to support heart and kidneys in some instances, to allay thirst after operation, etc. From this list which is not even complete, it may be seen that the uses of proctoclysis are manifold and important. In fact, the measure is often life-saving, and its execution which is one of the most valuable services of the nurse, depends for its success upon close attention to technical details.

The solution most commonly used, is normal saline; in some conditions a combination of 2 per cent sodium bicarbon-

ate and 3 per cent glucose solution, or a 5 per cent glucose solution better serves the purpose.

The apparatus consists of a douche can or other container which is suspended from a stand conveniently near the bed. Attached to the can is a long rubber tube which at about its middle has a bulbous glass "dropper."

The end of the rubber tube is connected by means of a glass connection tube with a soft rubber catheter which, after insertion into the rectum, is fastened to the inside of the thigh with a strip of adhesive plaster. The rate of inflow is regulated

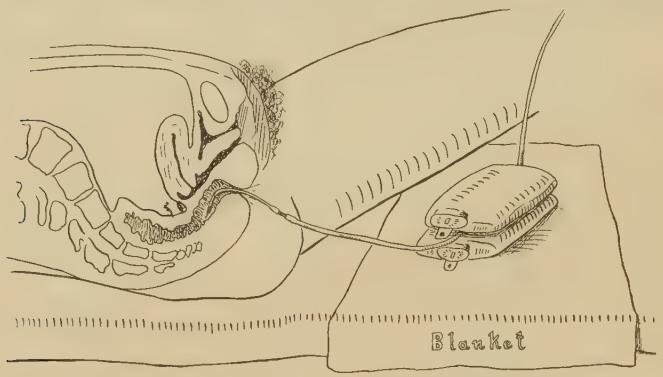

Fig. 104.—Arrangement to keep the water warm in proctoclysis.

by a clamp near the container. Thirty drops a minute are easily tolerated by the patient and readily absorbed from the rectum; this will give 6 pints in twenty-four hours. The escape of gas or back pressure due to straining, vomiting or coughing takes place without interference. In some hospitals, a double tube outfit is in use whereby gas or backflow of water may find unhindered outlet.

If the usual hospital apparatus is not available, a fountain syringe may be used as a makeshift. With this, the rate of flow can be regulated only by the height of the container.

The most important point to be borne in mind is this that the solution must be warm as it enters the rectum; else it causes reflex spasms and imposes upon the weakened organism of the patient the strain of heating the water. One often sees an electric light bulb in the can or hot water bags bound to its

outside. This, to my mind, is a faulty arrangement. The water is hot in the can but has cooled off by the time it reaches the rectum. It is far better to place the tube where it joins the catheter, between two hot water bags which in turn are wrapped in a blanket so as to preserve their heat (Fig. 104). Hot water bottles of metal with a canal in the center through which the rubber tube can be passed, are now on the market for the purpose of keeping the enema fluid at proper temperature.

QUESTIONS

1. What is an enema, and for what purposes is it given?
2. How would you give an enema?
3. Wherein does a colonic flushing differ from an enema?
4. Name two formulas for laxative enemas. How do you prepare a starch enema?
5. What are nutrient enemas? How are they to be given? What is the amount?
6. Describe proctoclysis—the apparatus, the solution, the technic, and some of its uses.
7. How do you keep the water warm in proctoclysis?

CHAPTER XVII

HYDROTHERAPY

Sometime in the latter half of the eighteenth century an Austrian shepherd, Vincenz Priessnitz by name, found that the broken legs of his sheep would heal more quickly if he bathed them in the ice cold springs which gushed from the mountain side. That was the beginning of the water treatment or, to give it its technical name, *hydrotherapy*. Since then this method of treatment has been enormously developed and amplified and now is an important feature in every field of practical medicine.

In gynecology, too, we make extensive use of hydrotherapy. The various forms of hot and cold baths, "temperature sponges," hot stupes, hot or cold packs, etc. are, of course, the same as in other lines of work and in order to avoid unnecessary repetition, the reader is referred for their technic to the works by Harmer, Maxwell and Pope, or other textbooks of practical nursing. We shall deal here more specifically with those hydrotherapeutic measures which are either essentially gynecological or employed very frequently in our specialty.

THE SITZ BATH

The patient is clothed in an undershirt, stockings and slippers. The bath is given in a specially shaped tub (Fig. 105) which allows the patient, while sitting in it, to place her feet on the floor with only the upper part of the thighs and the trunk to about the waist line immersed in water. The undershirt is turned up as far as necessary and a large blanket is fastened at the neck or around the waist and envelops both patient and bath. An ordinary wooden wash tub may take the place of a sitz bath tub. It should be raised on a low wooden box; otherwise the position of the patient is cramped and uncomfortable. A blanket or rubber ring at the bottom, a folded bath towel to pad the edge and ease the knees, and an

upturned chair on the wall as a back rest will materially add to the patient's comfort.

The temperature ranges between 100 and 110 F. The duration is from ten to thirty minutes. The addition of bran, camomile or baking soda renders the water softer and more agreeable to the patient.

Fig. 105.—Sitz bath. (From Gellhorn, "Non-operative Gynecology" published by D. Appleton and Co.)

Bran Baths.—One pound of bran in a bag is boiled in 2 quarts of water, and the decoction is poured into the sitz bath.

Camomile Baths.—A handful of camomile flower is boiled in a quart of water and the extract strained through a sieve into the bath.

Soda Baths.—A handful of baking soda is dissolved in the water.

The various uses of the warm sitz bath are:

1. As a sedative for painful menstruation or in insomnia, when it is to be taken at bed time, not too hot, but for at least twenty minutes.

2. In inflammatory conditions of the vulva, for instance, in suppurating glands of Bartholin, where the prolonged hot bath will encourage the spontaneous opening of the abscess.

3. In secondary irritations of the vulva, sitz baths of a slightly lower temperature and containing a weak solution of permanganate of potassium (a few crystals will stain the water the color of a rose) quickly relieve the discomfort and irritation caused by urinary fistulae, purulent vaginal discharge, diabetes, etc.

4. In inflamed hemorrhoids or excessive swelling subsequent to operations on the perineum or anus. Here, too, the addition of potassium permanganate or camomile is advisable.

5. In painful urination or spasm of the sphincter of the bladder causing retention of urine, to relieve the distress until the specific cause has been remedied.

6. In *chronic* inflammatory conditions of the pelvic organs. The heat of a prolonged sitz bath relieves congestion, reduces pain, and favors absorption.

7. In *acute* inflammatory processes in the pelvis the temperature of the bath must be lower. At a temperature of 70 F. the duration is from three to five minutes, at 80 F. the patient remains in the bath ten minutes. While in the water, she massages her abdomen and back gently with a rough bath mitten.

In all these baths, the patient must be protected from chilling. A cold cloth on the head repeatedly changed, prevents a rush of blood to the head with resulting congestion and headache. The bed meanwhile is covered with a blanket, over this a sheet, both warmed with hot water bags. The patient rises, dries herself superficially, and at once goes to bed, where the sheet absorbs the rest of the moisture. The sheet is then removed, the blanket a little later. If the patient responds well, the sitz bath may be given daily.

THE MOIST COMPRESS

Moist compresses applied to the abdomen are soothing in abdominal pain of various origins (painful menstruation, pelvic infection) and favor absorption of exudates. They are applied in two forms:

1. A large towel is wrung out of water of 110 F. and placed in several thicknesses upon the abdomen, to be covered completely with a blanket and renewed every hour, or oftener.

2. A towel of ordinary size, wrung out of water of about 100 F. or even room temperature, is put on the abdomen. Over this comes impervious material in such a way that *the cover overlaps the moist compress at least 2 or 3 inches on all sides.* The material commonly used is oil silk or oilcloth. The former becomes defective in a few hours, the latter is much too stiff. Far better is a thin rubber sheet, so-called "stork sheeting," which is inexpensive and very durable. As there can be no evaporation, the moist compress retains its heat and leads to an even warming of the entire abdomen. This compress requires renewal but once in twelve hours. If the patient becomes conscious of coolness and moisture, the impervious cover must be inspected and adjusted. The effect of this beneficial procedure depends altogether on proper attention to technical details, and it is essential to prevent access of air, however slight, to the moist pad. The edges of the impervious cover should, therefore, be kept down on the skin by adhesive plaster; or, better still, the cover should be two or three times the size of the pad so as to envelop the abdomen almost completely and be kept in place by means of a binder. Between the applications, the skin should be thoroughly dried and oiled lest it become irritated and itching.

It is a matter of actual observation that moist compresses are frequently applied incorrectly so that the patients are deprived of the benefit of this procedure which is essentially within the nurse's province. For this reason two illustrations are added which show the right and the wrong way of application (Figs. 106, 107).

One sees only too often a moist compress first covered with a sheet of dry cotton and over this a small piece of oil silk; or else the cover is flush with the moist pad; and over the whole there is placed a warm water bag. *Such an arrangement is entirely faulty.* The nurse should remember from her high school lessons in physics, that moisture exposed to air will inevitably evaporate. Evaporation again reduces temperature and this, in turn, produces the sensation of cold. Hence, a warm moist compress exposed to air even to a very

small degree, first becomes cold and then dry. The result is that the patient feels uncomfortable and is not relieved of the condition for which the compress was ordered.

At the risk of repetition it must, therefore, be said again that only by the use of a truly impervious material which is so pliable that it adapts itself to the shape of the body, can both moisture and heat be retained in the compress, provided the cover extends considerably beyond the edges of the

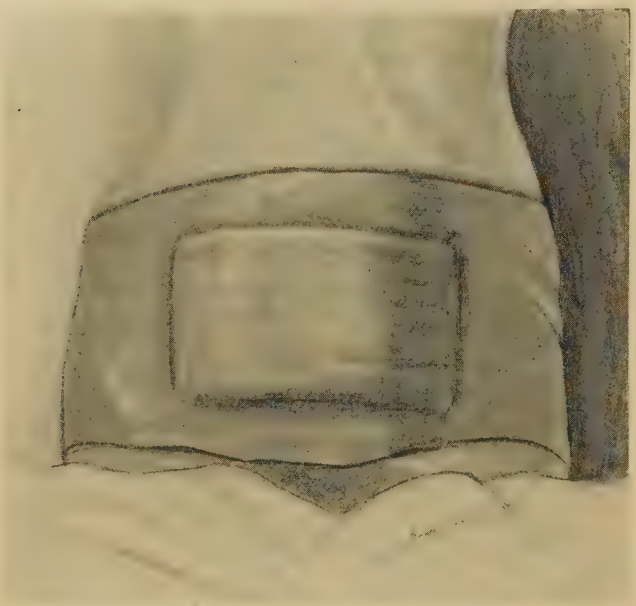

Fig. 106.—Correct method of applying a moist compress.

compress. A *hot water bag on top is unnecessary.* It may even be harmful because it may conceivably cause superficial burns.

Speaking of the use of the moist compress in affections of the upper abdomen, Clendening says: "The amount of relief obtained with this is out of all proportion to its ease of application. In many cases of gall-bladder affection it equals a dose of morphine. It is valuable for the pain of gastric ulcer and of intercostal neuralgia and pleurisy."

That this is equally true of certain conditions in the lower abdomen, I have already mentioned. In addition, the method is most valuable in the treatment of chronic constipation and particularly for the relief of distention. In the latter case it is advisable to insert a catheter or thin rectal tube into the rectum and leave it there during and for some time after the treatment. The free end of the tube must lead into a basin or pan in the bed because fecal matter is frequently expelled with the gas.

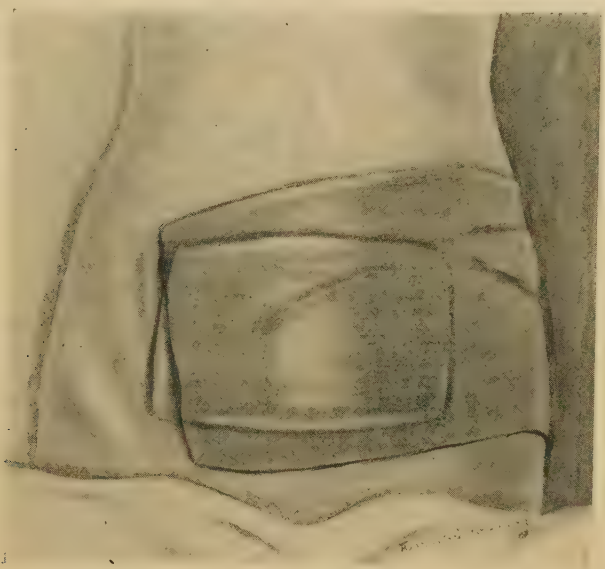

Fig. 107.—Incorrect way of using moist compress.

After an abdominal operation, the incision, at the first change of dressings, appears at times irritated and its immediate vicinity reddened and infiltrated. This denotes a disturbance in wound healing which is often benefited by a warm moist compress. The latter must be of sterile gauze which is wrung out of a sterile salt solution. The wringing out should be accomplished with sterile instruments, and the hands of the nurse must not come in contact with the gauze pad. When the compress is changed after six or eight hours, the reddening

and swelling may have disappeared and the healing process continue undisturbed. If, on the other hand, the infection is too far advanced, its further spread can be checked by the moist heat; the pus will then break through at some point, and the wound cavity will quickly clean itself and fill up with healthy granulations. On account of the discharge, the compresses must be changed three times in twenty-four hours.

The same kind of warm saline compresses is also valuable after operations on the perineum or vulva when swelling and pain or an infection call for relief. In this locality an air-tight application is somewhat difficult but can be accomplished by means of a T-binder and a sufficiently large piece of rubber sheeting. Sometimes a very weak solution of aluminum acetate (two teaspoonfuls of the solution in 1 quart of warm water) is used instead of saline solution.

THE ICE-BAG

We make extensive use of the ice-bag in acute inflammatory conditions in the pelvis, particularly when the peritoneum shows signs of irritation. It reduces the inflammation and relieves pain, and in internal hemorrhage, for instance, in a ruptured tubal pregnancy, it keeps the bleeding within bounds until the life-saving operation can be performed. Moreover, in all the conditions mentioned it keeps the patient quiet, which is an important part of the treatment.

Ice-bags of rubber or rubberized material with screwtops are obtainable everywhere. To fill an ice-cap, break the ice into pieces about the size of a walnut. Pour warm water over the ice to make the sharp edges smooth and prevent injury to the bag. Do not fill the bag more than half its capacity and squeeze out all the air before screwing on the top. *Always wipe the bag dry and wrap it in a thin towel before putting it on the bare skin and change the towel from time to time as the ice-cap will "sweat" after a while; also expel the air as needed.* To put an ice-bag on top of abdominal dressings or over several thicknesses of underwear is, of course, useless. It is a good plan to apply and to remove the ice-cap alternately at intervals of half an hour. Where the ice is not well borne by the patient,

or where the skin appears bluish or mottled, it is unwise to persist in its use.

When an ice-cap can not be procured, a fair substitute can be obtained by spreading upon a napkin a layer of linseed meal, 1 or 2 cm. thick, placing upon this a layer of cracked ice, covering this with a second layer of flour, and finally folding the rest of the napkin over the whole. Such an ice pillow will keep for two hours before the ice melts and wets the flour.

Hot water bags should never be used to serve for ice-caps.

Speaking of the method of filling and applying ice-bags, Harmer says: "Nothing annoys or discourages a physician and destroys his confidence in a nurse more quickly than to visit a patient and find these applications, for which a nurse only can be responsible, improperly applied. For instance, it is most annoying to find the patient's gown and the bed linen wet and the patient uncomfortable and chilled from the leaking bag; the bag lying in the bed, on the bedside table, or displaced to some part of the body where it is not intended to be, the ice melted and the bag filled with warm water, or the patient exhausted from supporting its weight. A good nurse will never be found guilty of such carelessness and neglect."

THE COLD HEAD COMPRESS

It is a time-honored custom to apply ice-bags to the head in a large variety of conditions, for instance, in fever, for headaches, to prevent congestion to the head, etc. Its value has been greatly overestimated. It covers at best but a very small area; if placed on the hair, the cold will hardly penetrate, and if applied to the forehead, it soon causes a disagreeable sense of burning. A cold compress is preferable. It is usually applied to the forehead only. It may be made of several thicknesses of gauze with all raw edges turned in so as not to annoy the patient. A wash cloth or a man's handkerchief will also serve. Compresses must be kept moist and be changed frequently. A basin containing ice and water should be at the bedside. While one compress is on the head, a second one may be made ready for use. The compress should be cold and moist when applied but not moist enough to drip and dampen the pillow.

VAGINAL DOUCHE

This is an injection of water or some watery solution into the vagina. The apparatus required consists of a douche bag or can to which a long piece of rubber tubing is attached, and a douche nozzle. The rubber "fountain syringe" is in general use, but irrigators of glass or cans of enamel ware are preferable and commonly used in hospitals. The nozzle is made of glass or hard rubber with numerous perforations on the side, but none at the end. Glass nozzles are not very practical and should be inspected for cracks before insertion. The hard rubber nozzle does not stand boiling well and for that reason is usually not kept clean. *Better than either glass or hard rubber nozzles are soft rubber catheters which are attached to the irrigator tube by means of a glass connection.* The catheter is readily sterilized and its introduction is painless even where the vaginal entrance is highly sensitive (inflammation, after perineal operations). Bulb syringes, "whirling sprays" and the like are objectionable.

To clean the douching apparatus, it should be wrapped in a large towel (or in a private house, a pillow case) and immersed in water which is put to boil for ten minutes. After use, the irrigator is hung up and protected from dust by a towel; the nozzle should always be boiled for each douche.

The proper administration of vaginal douches requires the observance of certain general rules:

1. *The patient must recline in the bath tub or, preferably, upon a douche pan.* Only then will the fluid come into direct contact with all parts of the vagina. If a douche pan is used, it should be warmed or padded with a folded towel. It is slipped under the patient in such a way that her night gown cannot become soiled. A pillow is pushed beneath the hollow of the back so that the patient lies in comfort and without any exertion. Else, she is under a constant strain to maintain her position, and this is the reason for the exhaustion that is occasionally complained of after a vaginal douche (Fig. 108).

2. *All douches must be given with low pressure,* that is, the douche can should be but a foot or so higher than the pelvis of the patient. High pressure may force fluid into the uterus and even the peritoneal cavity, and cause severe colics. A

case has been reported where a piece of a match was found in the uterine cavity following such an improperly given douche.

3. After the patient has been suitably draped and protected from chilling, with only the vulva exposed, the labia are very gently separated by the clean or, better, gloved fingers of the left hand and the douche nozzle is inserted gently. *It is, however, introduced only half way into the vagina.* The law of gravity operates within the vagina as well as outside the body, and as the direction of the vagina in the recumbent posture is downward, the fluid itself will sufficiently distend the vaginal tube (Fig. 108).

Fig. 108.—Position of patient on bed pan or douche pan. The pillow beneath the back is essential to the patient's comfort.

4. *After-care of Patient and Utensils.*—The patient remains in the reclining position for about half an hour after completion of the douche so as to give the fluid more time to act upon the vaginal walls. A thick vulvar pad beneath the patient will absorb the fluid as it is gradually expelled from the vagina. Meanwhile the pan and other utensils are removed from the bed side. The nozzle or catheter is not put back into the can so as not to contaminate the latter, but is disconnected and placed in a separate basin. The douche pan is emptied, thoroughly cleansed and sterilized. The same is done with the nozzle. The rest of the apparatus is dried and put away.

Vaginal douches are given either for cleansing or for curative purposes.

(*a*) *Cleansing douches* contain plain boiled water, saline solution, bicarbonate of soda (1 per cent), lysol ($\frac{1}{4}$ per cent), boric acid (2 per cent) etc., as ordered by the physician. The temperature is about 110 F., the quantity of fluid two or three quarts, the duration of the procedure ten or more minutes.

Cleansing douches are usually prescribed before vaginal operations, or where there is an abnormal discharge. Where a pessary is worn, daily douches, preferably with soda, and best taken at bed time, are absolutely necessary to prevent the almost inevitable irritation of the vaginal walls.

(*b*) *Curative douches* serve (1) to bring astringents or antiseptics in contact with the vaginal walls; (2) to affect the circulation.

1. *Medicated douches* are prescribed for abnormal discharge. If the latter is very copious, the chemical agent in the douche can hardly penetrate to, and act upon, the inflamed vaginal wall; hence, a mucus-dissolving douche with bicarbonate of soda should precede the medicated douche. For the latter an endless number of drugs have been recommended. In most common use are lysol, carbolic acid, and bichloride of mercury. In the preparation of these disinfecting or antiseptic douches the nurse must be particularly careful as to the proper strength and temperature, lest she poison or scald her patient. The solution for the douche should, therefore, be prepared in a separate vessel and the temperature tested before it is poured into the douche can. Lysol douches are given in a $\frac{1}{4}$ to $\frac{1}{2}$ per cent solution (1 to 2 teaspoonfuls in 2 quarts of water). Carbolic acid is used in a $\frac{1}{4}$ per cent concentration; that is, a teaspoonful is first mixed in a tablespoonful of glycerin and then added to 2 quarts of water. If this precaution is not observed, the carbolic acid will not be dissolved and may cause serious burns. Bichloride of mercury douches should not be stronger than 1:10000 because of the danger of absorption; numerous deaths from this cause have been recorded in the literature.

Of astringents, the liquor of aluminum acetate (tablespoonful in each quart) is by far the best. If the powdered aluminum acetate or pure alum are used, dissolve a teaspoonful in 2 quarts. Other astringents are sulphate of zinc or sulphate of copper (2 teaspoonfuls in 2 quarts) or tannic acid (tablespoonful in 2 quarts). Where there is much pain as, for instance, in a neglected inflammation of the vagina, infected tears of the hymen, ulcerations within the vulva, etc., 25 drops of tincture of opium added to the douching fluid, are useful.

In erosions of the cervix or the scant but highly irritating vaginal discharge in women past the menopause, pyroligneous acid (tablespoonful in a quart) gives excellent results.

Cancer of the cervix or vagina calls at times for deodorizing and disinfecting douches. Formalin (teaspoonful in a quart) or potassium permanganate (1:4000) may occasionally be used with advantage, but on the whole, their usefulness is very limited.

Medicated douches should not be hot, at any rate not above 104 F. In most instances, the exact strength and temperature will be prescribed by the physician.

2. *Prolonged hot douches* without any medicinal ingredients are of undoubted value in hemorrhages or to promote absorption of exudates. If, for instance, the menstruation does not cease after five or six days or returns for days after exertion, coition, or defecation, the protracted hot douche frequently checks the bleeding, provided, of course, the presence of a malignant condition can be excluded. For this reason, the nurse should not administer such a douche on her own responsibility without a previous examination by a physician. Again, in chronic exudates, subinvolution, chronic inflammation of tubes and ovaries, etc. (Chapter III) the prolonged hot douche improves the circulation and encourages absorption; it also relieves pain and has a quieting and sleep-producing effect.

In this mode of application, the temperature should be between 110 and 115 F. The uterus and vagina are not sensitive to heat, but the vulva and perineum must be protected against burns by a thick layer of vaseline. The quantity of water must be 20 or more quarts which would necessitate the frequent removal and emptying of the douche pan, an annoying and exhausting procedure. A small spout at the lower end of the pan, to which a rubber tube is attached, will serve to carry the douche water to a bucket at the side of the bed (Fig. 109).

A more convenient way of taking such protracted douches, which can be arranged in the hospital as well as in any household where there is running hot water, is shown in Fig. 110.

A piece of soft rubber tubing, about 3 feet long, is fitted over the faucet of the bath tub and fastened to it with a string.

The smallest caliber of tubing is used. Now the hot and cold water supply is regulated to a suitable temperature (110 F.), *the force of the water stream being kept down to a minimum.*

Fig. 109.—Vaginal douche given with a special attachment to protect the vulva from burns. Note the spout at the douche pan which obviates emptying. (From Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

The patient, dressed in a short night gown, stockings and slippers, lies in the bath tub on several thicknesses of blankets which are covered with an oil cloth. The buttocks project an inch beyond the edge of the blankets. Head and back are

supported by pillows. The feet rest on bricks, pieces of wood, flatirons or the like. The patient (or the nurse) introduces the free end of the tubing without a nozzle; the tubing, hanging over the knee and fastened to the inside of the thigh by a strip or two of adhesive plaster, needs no further handling. The water runs into the vagina and out into the open waste in a continuous stream without wetting the patient. A leaf or two from the dining room table across the bath tub and a covering blanket (not indicated in the sketch) protect the patient against chilling.

Fig. 110.—Protracted hot douche in bath tub. (From Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

Thus comfortably arranged and without any physical exertion, the patient can take a douche of one-half to one hour's duration each day. There should be a pause every third day to give the vaginal mucosa a chance to recover from the inevitable softening of the vaginal lining. Aside from this, this practically permanent douche has a very pronounced beneficial effect both upon the local and general health of the patient. Should there be fever—and the temperature should be taken regularly after the douches during the first few days—it would indicate that the inflammation is still too recent to permit of

this form of treatment. Slight elevations of temperature (to about 100 F.), on the other hand, do not forbid continuation of the treatment.

After the first trial, the nurse will realize that this form of prolonged hot douching is a time and labor saving device which carries with it the highest degree of efficiency and comfort.

QUESTIONS

1. Describe the method of giving a sitz bath. What is it generally used for?
2. How do you apply a moist compress? Name some of its purposes.
3. How would you fill and apply an ice-bag?
4. How would you give a vaginal douche? What is the position of the patient? Describe the douching outfit.
5. What are the principal uses of a vaginal douche?
6. What are the ingredients of a cleansing douche?
7. What is the temperature of a vaginal douche?
8. How do you prepare a carbolic acid douche?
9. Describe the care of the utensils before and after giving a vaginal douche.
10. What is a protracted douche?

CHAPTER XVIII

HEAT TREATMENT

Heat has been a household remedy from time immemorial for the relief of pain and the reduction of inflammatory swelling. Any part of the body which is exposed to heat, becomes reddened. The superficial vessels which ordinarily are in state of moderate contraction, relax and dilate under the influence of heat, and fresh blood rushes into these dilated vessels. This superabundancy of fresh blood, the so-called "arterial" or "active hyperemia," not only produces the heightened color, but also drives out the venous blood in the exposed area. In inflamed tissues there is always a marked congestion of such venous blood, a venous or passive hyperemia, which produces swelling and exerts pressure on the sensory nerves and thus produces pain. The active hyperemia then, by pushing the venous blood out, relieves this pressure and, at the same time, washes the products of the inflammation away. The process may be likened to a littered gutter which is cleaned out with fresh water squirted from a fire hose.

There are various means of producing such an active hyperemia, but heat is the best; and from what has been said above, it follows that the more heat we can apply, the more intensive will be the hyperemia and the more pronounced its beneficial effect.

Heat may be used in gynecology in the form of moist heat, contact heat, and radiant heat.

Moist heat in the form of baths, douches and compresses is discussed in the chapter on Hydrotherapy. As a matter of practical experience moist heat can be borne by the body only to a very limited degree. Experiments have shown that a full bath of eight minutes in water of 114 F. is dangerous to life. The hands may be immersed in water of 123 F. at most, and water of 140 F. causes intense burning in the skin. For vaginal douches a temperature of 112 is the maximum in most instances.

Contact heat is applied by hot water bags or electric pads. Neither of these can be used at more than 115 F. without the danger of burns.

In radiant heat, dry superheated air is used which can be tolerated at much higher degrees than either moist or contact heat, and the proportion of active hyperemia is correspondingly increased. The most convenient way of applying heated air is by means of electric light bulbs. The apparatus used is a semicircular cradle of aluminum or other metal

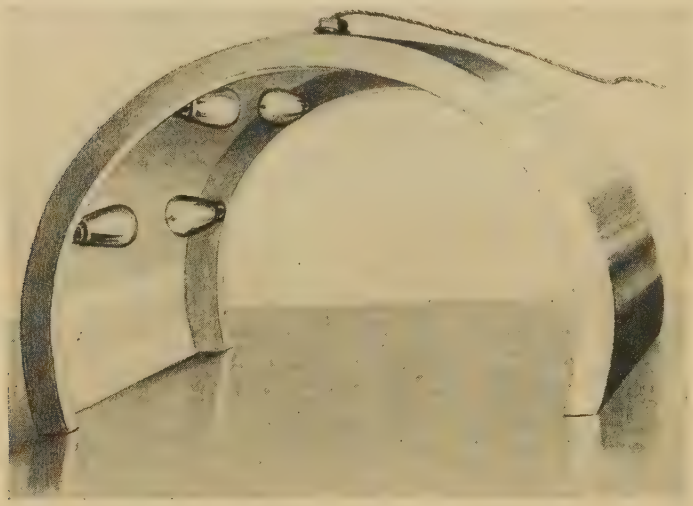

Fig. 111.—Electric heater. (From Gellhorn, "Non-operative Gynecology," published by D. Appleton and Co.)

covered on the inside with asbestos and bearing a number of electric light bulbs; a long cord furnishes the connection with the nearest light switch (Fig. 111). Such appliances, called electric bakers or electric heaters, are in various forms on the market.

The mode of application is exceedingly simple. The part of the body to be heated is bared; this in most cases is the lower abdomen. The apparatus is placed over the abdomen, the lights are turned on, and a blanket is put *snugly* around the apparatus, making the air chamber as small as possible and preventing hot air from escaping; the smaller the area

exposed, the greater the amount of heat tolerated. Therefore, all parts beneath the cradle which are not involved in the pathologic process to be treated, are covered with bath towels; these are the iliac bones which, poorly protected by adipose tissue, are very sensitive to the heat, the flanks and the upper portions of the thighs. Let me repeat that only the area to be treated must be left uncovered. A cold moist cloth—*not an ice-bag*—is placed on the forehead of the patient, and she is urged to drink large quantities of water.

With all lights burning, a temperature of from 200 to 220 F. is reached within twenty minutes. The immediate result is a profuse perspiration all over the body, but chiefly in the exposed area. Unless this perspiration is wiped off from time to time, the beads of moisture will be heated to such a degree as to cause blisters.

The patients, at first, feel very comfortable. After about ten minutes, when the temperature reaches about 180 F., they frequently complain of intense burning. It is imperative to be guided by the sensation of the patients and to discontinue the treatment for the time being. The sensitiveness decreases, however, at each following application so that after a few days the patient will bear the baking process for twenty or thirty minutes. The skin of the exposed part becomes intensely red, either diffusely or in more circumscribed areas. In some cases dark brown zones remain which are due to the pigment of destroyed blood corpuscles; these pigmentations disappear in time. Burns can be avoided with proper care. Weak and anemic patients may occasionally complain of excessive fatigue, palpitations, dizziness, and even nausea, but such by-effects are uncommon.

There is no hard and fast rule as to the length of each treatment. It is preferable to apply the heat about ten or fifteen minutes the first time until we see how the patient will react. Gradually the treatment is lengthened, at the most to thirty minutes, *but in no case should the temperature be raised when the patient complains of the heat.* After the treatment, the patients should be allowed to cool off gradually by leaving them in the apparatus for one-half hour longer or by wrapping them in hot blankets. Whenever feasible, they should receive

a cool sponge bath or an alcohol rub. The treatments may be given daily and may be combined, at the discretion of the physician, with other conservative methods, such as douches, tampons and protein therapy.

The principal field for dry heat is in the treatment of chronic inflammations within the pelvic cavity (page 48). The immediate effect in most cases is a marked decrease of pain. The pain will return after a time, but its intensity diminishes with each subsequent treatment. The appetite frequently improves very much; and not only during the treatment, but afterward as well, larger quantities of water are taken. Most patients experience a pleasant sensation of relaxation and have a refreshing sleep, particularly when they are given a cool sponge bath immediately after the treatment. It is a rather rare occurrence that highly nervous women become unduly excited and irritated; in such cases the treatment must be given up.

The late results are, as a rule, equally gratifying and a complete cure is very often accomplished. It is difficult to gauge beforehand the number of treatments required in each case; they varied in my experience from eight to thirty-five. Fever present before, or occurring during, the treatment is a contra-indication to the use of hot air. Slight rises around 100 F. need not deter us.

This treatment may also be used with marked success in the management of patients after operation. Applied in shock after severe and prolonged laparotomies, it supplies external heat to the body more rapidly than any other method. It also reduces the pain of intestinal distention on the first few days following operation and gives very decided relief in the painful swelling of fresh abdominal or perineal wounds.

In very recent years, heat has been used in gynecological practice in the novel form of *diathermy*. Diathermy which means heat-penetration, differs essentially from moist, contact or radiant heat, for in all these methods heat is applied from *without*. In diathermy, on the other hand, heat originates *within* the body. A high frequency current of low voltage, by passing through the body or certain parts of it, transforms its electric energy into heat because of the resistance of the living tissues. The current flowing from an outer larger

electrode to a smaller electrode in the vagina or rectum, thus heats the tissues through which it travels, particularly in the neighborhood of the smaller electrode because the diminution of the size of the latter causes an increase of the density of the current whereby its heating power is proportionally increased. This explains why the penetration of heat which in the other methods mentioned is limited to the surface, is very deep in diathermy when heat ranging from 104 to 112 F. and more is produced within the affected tissues themselves.

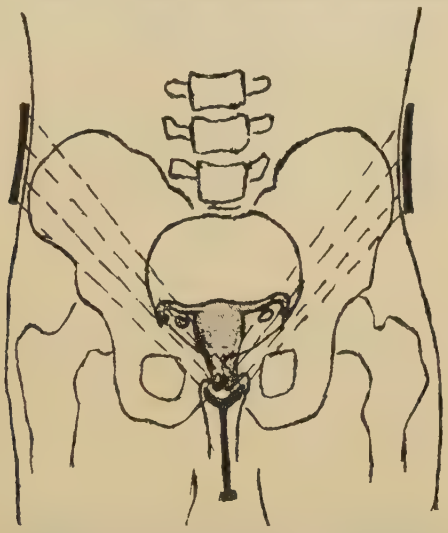

Fig. 112.—Diagram of heat penetration in diathermy. (Gellhorn in "Gynecological and Obstetrical Monographs," published by D. Appleton and Co.)

Figs. 112 and 113 show diagrammatically how this heat-penetration reaches the organs and tissues in the pelvic cavity. The effect of the heat on the circulation is, of course, the same as in all other forms of heat treatment, but because of the higher temperatures obtained it is more pronounced. It is also possible that, in diathermy, obscure electric effects upon the organism are at work, perhaps in the sense of intensifying the vitality of the tissues.

Diathermy is applied by means of a high frequency apparatus of which there are several models on the market. The

manufacturers supply the necessary technical instruction. Many hospitals throughout the country have installed these

Fig. 113.—Another diagram of electric heat penetration. (Gellhorn, "Gynecological and Obstetrical Monographs," published by D. Appleton and Co.)

apparatus in their physiotherapy departments where, as a rule, specially trained nurses carry out the treatment according to the direction of the physician.

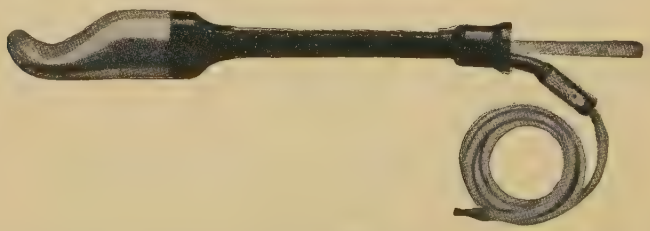

Fig. 114.—Vaginal electrode used in diathermy. (From Gellhorn, "Gynecological and Obstetrical Monographs," published by D. Appleton and Co.)

Further details would be beyond the scope of this book. It is sufficient to have called attention to the principles of this new method of treatment. In order to give the reader a clearer conception, the picture of the vaginal electrode

(Fig. 114) is presented which surrounds the cervix and this attracts the electric currents from all sides. Where the pathological condition to be attacked, is located mainly *behind* the uterus, a special electrode is placed in the rectum (Fig. 115). For nurses who wish to take up this kind of

Fig. 115.—Rectal electrode for diathermy. (From Gellhorn, "Gynecological and Obstetrical Monographs," published by D. Appleton and Co.)

work, courses of instruction are available in most medical centers.

QUESTIONS

1. What is the effect of local heat on the body? How is this effect produced?
2. Name three forms of heat used in the treatment of gynecological diseases.
3. How is dry heat applied?
4. What precautions are to be observed in dry heat treatment?
5. What is the duration of each dry heat treatment?
6. What is the principal field for such treatment?
7. What is meant by diathermy?

CHAPTER XIX

PROTEIN THERAPY

In the last ten years a novel method of treatment for various inflammatory conditions has steadily been gaining ground in practical medicine. As we have seen in Chapter III, the body possesses natural means with which to defend itself against the attacks of bacteria. If the defensive apparatus is in good working order, the infection is checked, and the patient recovers. Where the resisting strength of the body is insufficient and the infection shows a corresponding increase, the scales may yet be turned in favor of the patient, if the feeble power of resistance is stimulated to greater effort by artificial means. Many of the latter have been in use for generations, as for instance, fresh air, sunshine, forced feeding, etc.; and good nursing, too, has its share in the final outcome, for it is obvious that the nurse can in many ways preserve and increase the patient's strength.

It was only about fifteen years ago when it was discovered more or less accidentally that the subcutaneous, intramuscular or intravenous injection of certain protein substances exerted a decidedly beneficial effect in many cases of infection. Out of scattered observations of this kind has gradually evolved a well-defined method of treatment which is called *protein therapy;* and this is probably the most powerful stimulant of the weakened resistance of the body against bacterial invasion.

This therapy has a very promising field in gynecology because pelvic infections of all kinds have been found to respond particularly well to protein injections; and as the treatment is becoming more and more popular with the profession, the nurse should have some insight into the underlying principles, the technique, and the after effects.

Of the numerous protein substances available, milk is the one most commonly employed. It may be used in the form of sterile ampoules which are in the market under various trade names. Even better is ordinary household milk if

properly prepared and sterilized. The milk must first be rendered fat-free by skimming or, preferably, by placing it in a centrifuge which is found in every hospital laboratory. In the latter case, the milk is placed in a centrifuge tube, which has previously been boiled, and the cream is sucked out with a sterile pipette, that is, a long piece of narrow glass tubing. The fat-free milk is then poured into a sterile test tube and boiled for ten minutes in a water bath in such a way that the test tube does not touch the bottom of the vessel (Fig. 116). The boiling is repeated after four or five hours after which the milk when sufficiently cooled, is ready for use.

It is now drawn into a sterile syringe through a long thin needle. Upon the upper outer part of the buttocks, an area

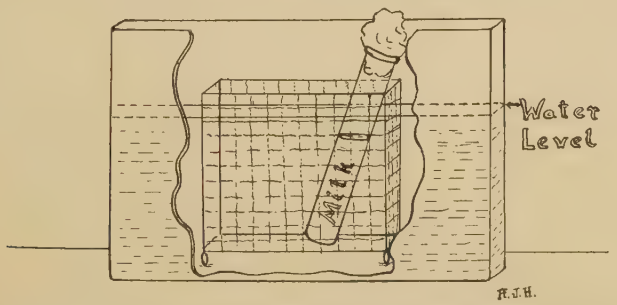

Fig. 116.—Method of sterilizing milk for intramuscular injection.

about half the size of the palm is first painted with tincture of iodine (Fig. 117). The iodine must not be washed off immediately with alcohol. On the contrary, one should give it sufficient time to penetrate into the skin, which takes at least two or three minutes. The injection is then made deep into the muscle. One should now wait a few seconds to see whether blood flows through the needle into the syringe. If this be the case, the needle must be drawn out, for it indicates that the needle has entered a bloodvessel, and the milk injection would produce serious disturbance and alarming symptoms. If there is no blood, the milk is injected, then the needle is withdrawn quickly, and the iodized area is washed off with alcohol.

The first injection is usually made with 5 cc., all subsequent injections with 10 cc. The injections are repeated every

third day, and if the needle is thin and sharp and thrust in quickly while the injection itself is made slowly, the procedure is practically painless. Some patients complain of a drawing pain in the leg, but this is rather the exception, and in any case lasts but a short time. Nor should there be any tender swelling or reddening at the site of the injection afterward. If it occurs, it signifies that the disinfection of the skin or the sterilization of the milk have been incomplete.

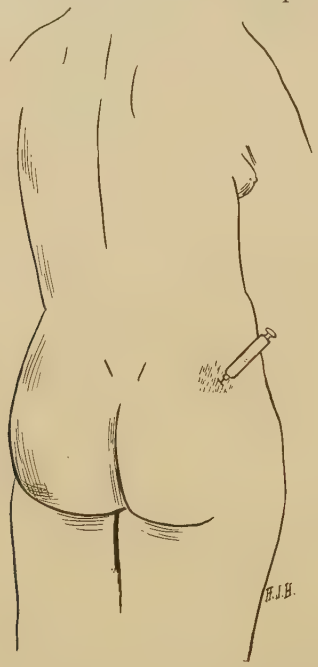

Fig. 117.—Painting the site of injection.

Six or eight hours after injection, the temperature of the patient is raised a few degrees. In some cases there occurs a very slight chill, nausea, perspiration or drowsiness, but all these symptoms disappear, as a rule, within the following twelve hours, and most patients feel better and stronger the next day. If a hard chill or a more marked alteration of the general condition occurs, it means that the milk was not made sufficiently fat-free.

The symptoms referred to usually become less pronounced after each succeeding injection. In favorable cases, the improvement is so marked, that hardly ever more than six treatments need be given.

QUESTIONS

1. What is meant by protein therapy? What is its object?
2. Which protein substance is most commonly used?
3. How is it prepared for use?
4. How is it employed?

CHAPTER XX

RADIUM

In 1898, Madame Curie, working with her husband in a tiny laboratory of their own in Paris, isolated from an ore called *pitchblende,* an unknown substance to which she, later, gave the name *radium.* The story goes that she handed the few grains of the white powder she had obtained, in a small pill box to the famous physicist Becquerel with the request to test the properties of the new substance of which she knew only that it became luminous in the dark, that is to say, emitted rays of light. Becquerel carried the box in his pocket for several days and was reminded of this fact when, a week or so later, an extensive skin burn developed on his hip. Thus the penetrating power of radium was discovered.

Radium is the rarest metal in our possession. At present there is less than a pound in existence in all the world. The ore from which Mme. Curie extracted the first radium, came from Joachimsthal in Bohemia, then a part of the Austrian Empire. On account of the limited quantity available and the great demand for it, the Austrian Government prohibited the exportation of pitchblende. This embargo led to the extraction of radium from poorer ores in different parts of the world. Among these, carnotite from Colorado played an important part, and for a number of years this country supplied practically all the radium sold. Since 1922, however, the discovery of rich radium ore deposits in the Belgian Congo has given a concern in Belgium a complete world monopoly. The price of one milligram, which corresponds to about one-sixty-sixth of one grain, was originally $125 and is now as low as $70. If we realize that the richest specimen of pitchblende contains only one part of radium in 4,000,000 parts of ore, that in good Colorado carnotite radium is present only in the proportion of about one part in 200,000,000, and that even in the best Congo ore the ratio is about 1:50,000,000; and if we further realize that many thousands of tons of ore must be

mined and subjected to a very long and expensive process of extraction, we can better understand both the rarity and costliness of radium.

Radium is indestructible as far as our practical purposes are concerned, as it only loses one half of its substance in 1700 years. That is to say, one grain of radium would be reduced to one-half grain in 1700 years; the remaining one-half grain would be one-fourth of one grain in another 1700 years, half of that in the next 1700, and so on. The reader can figure out for herself when it will all be gone.

In spite of its excessive rarity and tremendous expensiveness, we can all afford a bit of radium to light up our watch dials in the dark. The amount needed is infinitesimal. If it were more, it would scorch our skins. For, in addition to the luminous rays which first drew attention, radium sends out continually other, invisible rays which have the faculty of penetrating into our tissues.

It is this last kind of rays of which use is made in medicine. In gynecology there is a particularly wide field for these very rays, and the nurse will have frequent opportunity to watch the application of radium. The conditions wherein it is most commonly employed, are cancer and certain fibroids of the uterus. In the former its curative influence lies in the destruction of the cancer cells, while in fibroids it leads to shrinkage of the tumors. Occasionally, other conditions, for example, hemorrhages near the menopause from nonmalignant causes, are benefited by radium. The effect of radium varies in intensity according to the quantity used, the length of time it is left in place, and the kind of filters employed. Filters or screens, also called applicators, are containers of brass, lead, steel, silver, gold or platinum within which the radium is placed. These metal containers hold back certain rays which have merely burning but no curative qualities, but let the beneficial rays pass through into the tissues. To guard against burns even more securely, the containers are sometimes further wrapped in rubber.

The most common form of applicator for gynecological use is a capsule of one of the metals mentioned which contains a tiny glass capsule with the radium in quantities ranging from 25 to 50 or more milligrams, or approximately from $\frac{1}{2}$

to 1½ grains. The radium itself is a white powder. It is not pure, but in the form of one of its salts, usually radium bromide (Fig. 118).

Another very popular form of applicator are needles. These are of steel or gold and about two-thirds of 1 inch in length, with a solid tip on one, and an eye on the other end, while the middle part is hollow and holds the tiny glass tube with from 10 to 15 milligrams of radium. The radium needles are thrust into the diseased tissue direct and can be pulled out by the string attached to the eye.

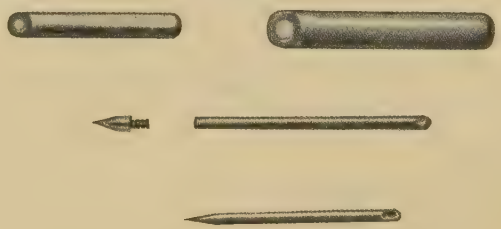

Fig. 118.—Various applicators of radium.

Radium treatments are graded by the amount times the duration of the individual treatment, and then expressed in milligram hours. For example, if 100 milligrams of radium have been left in place for twenty-four hours, we have 100 × 24 or 2400 milligram hours (mghrs.) This will help the nurse to understand the expression which is constantly used in radium work.

Of late, radium is being employed in yet another form. Radium in substance gives off rays, but radium in solution gives off a gas, called *emanation*, which, in turn, emits the same kind of rays that come from solid radium, but exhausts itself within a few days. To obtain this emanation, a rather large quantity of radium is needed, and for this reason there are in the country only a few places where the gas can be produced. The radium bromide is dissolved in water, and the gas is led through a complicated system of tubes where it is freed from impurities and finally led into a long capillary of glass or gold. Such a capillary is a tube of very fine calibre and thin walls. When it is filled with the emanation, it is divided into many small parts, each about one half

millimeter in length, with a high pressure flame which, at the same time, seals the cut ends. Thus a large number of tiny hollow pearls is obtained which are called "seeds" if made of glass, or "radons" if of gold. The latter are now preferred to the glass seeds. They are inserted deep into the tumor substance and left there. The small amount of emanation they contain, slowly diffuses, and the empty radons remain in the tissues without disturbance, if they have been properly sterilized.

Fig. 119.—Cancer of cervix, "needled" with radium. (From Bland "Gynecology," published by F. A. Davis Co.)

Here we can link up the subject of radium treatment with nursing duties. For the nurse is not only an interested by-stander, but has definite work to do in connection with radium treatment. She has to sterilize the applicators, whether capsules, needles or radons, before use. This can be done by boiling, but better and simpler is placing them in pure carbolic acid for 5 or 10 minutes and then in pure alcohol for the same length of time. She must be careful never to touch applicators with her fingers, for the frequent handling of radium may lead to deep burns. It is also important for

her not to hold radium too near her abdomen because the ovaries, if exposed too often to the penetrating rays, might conceivably suffer injury. The result might be amenorrhea or sterility.

Fig. 119 will give the reader an idea how a cancer of the cervix is "needled." After the insertion of the needles, the

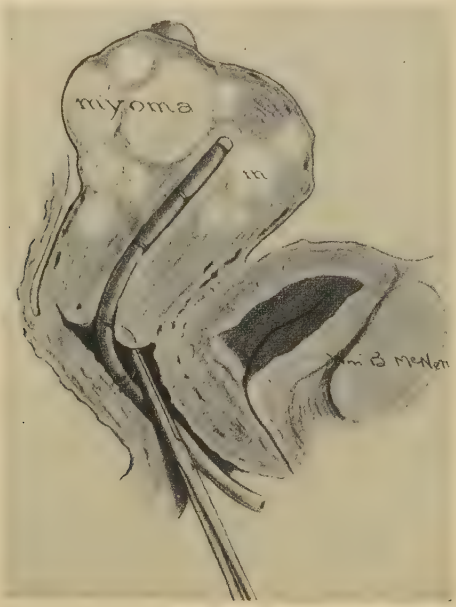

Fig. 120.—Intra-uterine radium treatment for fibroids of uterus. (From Clark and Norris, "Radium in Gynecology," published by J. B. Lippincott Co.)

vagina must be packed tightly with gauze, partly in order to keep the needles in place, partly to keep rectum and bladder as far away from the radium as possible. For this latter reason, too, it is a good plan to keep a retention catheter (preferably one of rubber) in the bladder (page 162).

In Fig. 120, one of the modes of intra-uterine radium application in a case of fibroids is represented. Two radium capsules are placed tandem-fashion in a rubber catheter.

After the applicators have been taken out at the end of the treatment, the nurse will again put them successively in carbolic acid and alcohol and then place them in the thick-walled container of lead in which they are kept.

The very greatest care must be exercised in the handling of radium, not only because it is so precious and the loss of an applicator would involve a large sum of money, but also because the radiation from a quantity of radium lying somewhere undiscovered might cause harm to healthy people. Patients while bearing radium, should, therefore, be watched carefully and not permitted to get out of bed, go to the toilet, or pull out the vaginal packing.

QUESTIONS

1. What is radium used for in gynecology?
2. What are radium applicators?
3. What is radium emanation?
4. How would you sterilize radium applicators?
5. What personal care should a nurse take when handling radium?

CHAPTER XXI

PREPARATION OF PATIENT BEFORE OPERATION

Most patients enter the hospital one day before operation. They should be put to bed because, as a rule, they are badly in need of rest; and the intern on duty should be notified by the nurse at once. The mental effect of a prompt visit both by the nurse and the intern can not be overestimated. The agitation and suspense on the part of the patient is somewhat relieved, for the time being, when she finds that an active interest is being taken in her without loss of time. The intern proceeds to write her history and to make a general physical examination. The condition of heart and lungs is determined by him, the blood pressure is measured, the clotting time of the blood ascertained, a microscopic, and in many hospitals, a chemical examination of the blood is made as a matter of routine, and, finally, the urine is examined. Thereby, the state of the vital organs (heart, lungs, kidneys) is determined; and it depends on the findings whether or not the operation will have to be postponed temporarily.

In all these examinations the nurse takes no direct part, but she can greatly facilitate them by intelligent cooperation. She should be present during the general physical examination thereby giving moral support to the patient who might be embarrassed by being left alone with a strange doctor. At the earliest possible opportunity she should secure a specimen of *catheterized* urine and notify the intern that she has taken it to the laboratory, lest this very important part of the examination be neglected. As has been mentioned in Chapter XV catheterized urine is better suited for examination than voided urine because the latter is apt to be contaminated with blood or discharges.

If a pelvic examination is to be made, the nurse has definite duties which have been outlined in Chapter XIII on Gynecological Examination.

The further preparations of the patient for operation are almost altogether in the nurse's province. They may be divided into mental and physical preparation.

Mental Preparation.—Only a very few patients approach an operation without fear. To most it is a thing of nameless dread to which they have consented only after a bitter inner struggle. It is generally known that this fear tires out her physical strength, disturbs her sleep, requires larger quantities of whatever anesthetic is used, and depresses the nervous system thereby contributing greatly to the shock which accompanies almost every operation. The nurse can do a great deal to ease the mind of the patient. By every look, word and action, says Harmer, the nurse must try to reassure the patient. She should encourage and strengthen confidence in the surgeon, in the nurses, in their unquestioned abilities to meet every situation, in the hospital, and in the adequate provisions made for proper care and recovery. Even though time is valuable, there must be no excitement or undue haste, no divided attention, and no impression given of having too much to do. The intelligent nurse will attempt to keep her patient's mind on matters not connected with her illness; she will not gossip about the patient next door or the one across the hall; and above all, she will not speak about "interesting cases," for what may be interesting to her professionally, is apt to be exceedingly disquieting to the patient.

Many gynecologists supplement this psychic treatment by prescribing several doses of bromide during the day, and insure a healthy sleep by means of some soporific.

Physical Preparation.—The physical preparation is made in most hospitals according to a special routine which the nurse carries out unless other orders are given. As an illustration, my own mode of procedure will be listed at the end of this chapter.

All routine preparations have as their object the preservation of the patient's strength and are based on certain definite principles.

The Digestive Tract.—Unless ordered otherwise, the patient takes three meals of the regular hospital diet. No food is given after the evening meal, but water is taken freely until an hour or two before operation.

Until recently, a cathartic was given on the afternoon or evening before the operation. This custom has now rather generally been abandoned except in special cases. Instead, a cleansing enema is administered both at night and several hours before the operation. This change in practice was brought about by the observation that patients operated upon in emergencies and without any previous purgation, stood the operation better and with less subsequent gas pains than those whose bowels had been thoroughly emptied by means of laxatives.

Heart and Kidneys.—Many operators pay no attention to these organs if they have been found normal at the general physical examination. Others prefer to strengthen them against the ordeal of the next day by certain "tonics." Among these, the various preparations of digitalis have proved particularly efficacious because by them energy is stored up in the heart muscle and, at the same time, the action of the kidneys is intensified.

Preparation of the Operative Field.—For all gynecological operations the entire abdomen and the external genitals should be shaved. Even if only a laparotomy is planned, it is desirable to shave off all the pubic hair down to the anus, for it may happen that unexpectedly some vaginal procedure may become necessary. The shaving should be done with a safety razor and a sharp blade, and the nurse should make it a point to work up a good deal of lather lest she cause small cuts or abrasions which not only annoy the patient but are apt to become infected and disturb the healing of the wound.

After the shave, the patient should take a tub bath or—what is far better and much more hygienic—a shower bath and scrub herself energetically with soap. Bed ridden patients are washed with soap and water according to the regulations prevailing in each hospital.

After these preliminaries, the succeeding steps differ. Some surgeons desire to have the abdomen wiped off first with ether, then, with alcohol (70 per cent), following this, with bichloride of mercury (1:2000) and finally covered with a wet bichloride towel or a dry sterile towel which is held in place by small adhesive strips or a binder. Other surgeons have a dry sterile towel placed over the abdomen after the bath and

left in place until a few hours before the operation when the operative field and its surroundings are painted with iodine, $3\frac{1}{2}$ per cent, which is permitted to dry before the abdomen is again covered with a sterile towel.

Regarding iodine, certain precautions are needed. Some people have a decided idiosyncrasy and react to iodine with an intense skin irritation which may result in blisters and be as severe as a second degree burn. Furthermore, the alcohol in the iodine solution is apt to evaporate whenever the bottle is opened, so that in course of time the concentration of iodine becomes too strong. For this reason, the alcoholic picric acid solution (5 per cent) has taken the place of iodine in many hospitals in this country, while in England other dyes such as gentian violet and brilliant green, are more popular. There is, moreover, a general trend toward simplification of pre-operative preparation noticeable in many quarters, and numerous surgeons and hospitals content themselves with having the field of operation shaved, well soaped and washed, and then merely covered with a sterile towel until the patient is placed on the operating table for final preparation (see Chapter XXII).

For vaginal work shaving, thorough washing with soap and water and protection by means of a sterile vulvar pad is all that is required on the day before operation. In many hospitals vaginal douches with lysol or some other antiseptic solution are given as a matter of routine. Their value in rendering the vagina free from germs is, however, highly questionable.

Preliminary Anesthetic.—Shortly before every operation (unless there are definite reasons against it) a hypodermic injection of morphine is given to dull the patient's sensibilities.* With this, atropine is combined so as to dry the secretion of the air passages and render narcosis easier. The amount of both drugs is usually specified by the surgeon.

Even more satisfactory is the induction of a mild "twilight sleep" by means of morphine and hyoscine (or scopolamine)

* It might not be amiss to point out, as a matter of general nursing technic, that all hypodermic or intramuscular injections in the arm should be made in the uppermost part (Fig. 121, *A*) where the injected fluid is quickly absorbed in the deltoid muscle. If injections are made lower down (Fig. 121, *B*), where the bone is relatively unprotected by muscle, they usually leave painful and indurated spots behind which give the patient discomfort for quite some time.

because this blunts the patient's perception more completely and erases the operation altogether from her memory. The first injection of morphine $\frac{1}{6}$ gr. and hyoscine $\frac{1}{1\,3\,0}$ gr. (scopolamine $\frac{1}{1\,5\,0}$ gr.) is given two hours before the operation. Fifteen minutes later, the eyes are covered with gauze pads which are fastened with narrow adhesive strips, and the ears are plugged with cotton soaked in oil, so as to reduce the irritation of light and sound. The action of the drugs is materially aided if

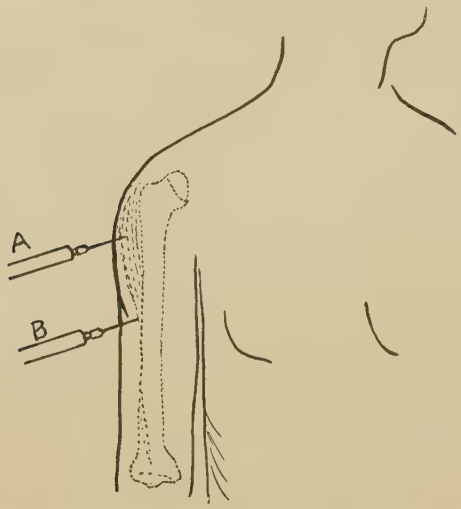

Fig. 121.—The proper place for a hypodermic injection is at *A*. Injections made at *B* leave painful spots behind.

the room is darkened and noise within and without prevented. The patient is now left undisturbed but is watched for there are some who become excited rather than quieted by hyoscine. If no such abnormal reaction occurs, a second hypodermic injection, this time only of hyoscine $\frac{1}{1\,3\,0}$ gr. should be given one hour before operation. Flushing of the face and slightly irrational moaning are of no importance. If, however, pulse or respiration are very much slowed down, the second dose of hyoscine should be omitted. It goes without saying that relatives should not be admitted after the first injection has been given.

Catheterization.—Fifteen minutes before the time set for operation, the bladder should be emptied by catheter. In

doing so, the nurse should be careful to disturb the patient as little as possible. In vaginal operations, catheterization is usually done by the operator himself after the patient is on the table.

Transport of Patient to Operating Room.—It is essential that the patient be lifted gently from her bed to the stretcher. Let the nurse secure enough help to do this without breaking through the barrier of her slumber. To coach the patient to climb on the stretcher herself, undoes the great mental and physical benefit of the "twilight sleep."

SUMMARY OF PRE-OPERATIVE ROUTINE

1. Prepare for abdominal (and-or-vaginal) operation at 9 A. M.
2. Triple Bromides gr. xv, t. i. d.
3. Tinct. Digitalis, Digalen, or some other digitalis preparation m. xxv by mouth t. i. d. If this nauseates patient, give one ampoule of digifolin or the like hypodermically t. i. d.
4. Regular diet.
5. Water freely until operation.
6. Veronal (gr. v), allonal, sulphonal, or the like at bed time.
7. Cleansing enema (soap suds or magnesium sulphate) night and morning.
8. Morphine gr. $\frac{1}{6}$ and Hyoscine gr. $\frac{1}{1\,3\,0}$ hypodermically at 7 A. M.
9. Hyoscine gr. $\frac{1}{1\,3\,0}$ hypodermically at 8 A. M.
10. Finish all preparations before first injection and keep patient quiet in darkened room, with eyes covered and ears plugged.
11. Catheterize at 8:45 A. M. (only in case of laparotomy).

QUESTIONS

1. What are the nurse's first duties on arrival of a patient for operation?
2. How does she prepare the patient?
3. What is meant by mental preparation?
4. What is the pre-operative routine as regards food, water, bowels, and bladder?
5. What are pre-operative anesthetics?
6. What special care does a patient require after receiving pre-operative anesthetics?

CHAPTER XXII

AT OPERATION

THE PATIENT

The care of the patient during operation devolves upon the "circulating" nurse. In many hospitals it is she who attends to the transport of the patient to the operating room. The patient should be wrapped in blankets while on her way, so as to avoid chilling, and should be protected, as far as possible, from disturbing noises. It is, for instance, an act of thoughtlessness to clang the doors of the elevator and thereby wake up the patient.

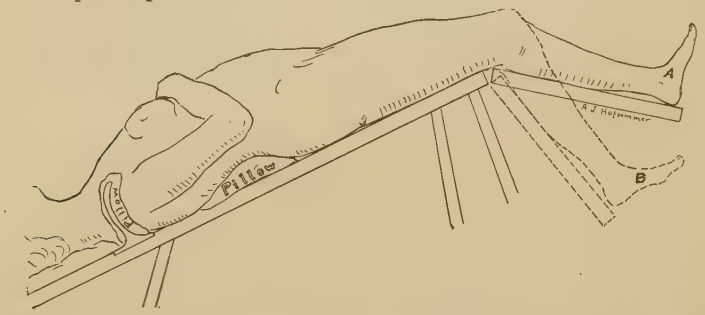

Fig. 122.—Position of patient on operating table. Note the pillow in the hollow of the back to prevent post-operative backache. Note, further, the padding of the shoulder braces and the proper angle at which the foot board is lowered (*A*). The dotted outline at *B* shows an excessive and harmful flexion of the knees.

Arrived in the operating suite, the patient is wheeled into the anesthesia room where such is available, or the operating room, and then lifted gently on the operating table, again with due regard to her artificially blunted sensibilities. There should be no noise and no loud speaking, and under no circumstances should she be permitted to see the instruments or any of the preparations for the operation.

The proper position on the operating table is of great importance (Fig. 122). A small, but firm pillow must lie in

the hollow of the back so as to maintain the normal curve of the spinal column. Without this precaution, the spinal column will sag under the influence of the anesthetic. This would lead to a stretching of the ligaments between the vertebrae and cause an intolerable and altogether unnecessary backache. The head, too, rests comfortably on a pillow. The shoulder braces are adjusted and padded thickly—not with towels or cotton, but with small pillows or, better still, with spongy rubber pads. In most gynecological operations, the patient will be put in Trendelenburg position* for a shorter or longer period of time, and in this case insufficiently padded shoulder braces may be the cause of paralysis of the arms by pressure on nerves. In order to prevent the entire weight of the body from resting on the shoulder braces in Trendelenburg position, the foot board of the table is lowered a few inches, merely enough to flex the knees slightly. This must, however, not be overdone, for too great a flexion (Fig. 132, *A*) might lead to pressure on blood-vessels and cause thrombosis (page 248).

Where the surgeon employs proctoclysis at the end of the operation, a rubber catheter is put into the rectum before the foot board is lowered. Let the nurse slip on a rubber glove for the insertion of the catheter lest she contaminate everything she may touch later!

During the induction of narcosis by the anesthetist, there should be deep silence in the room because the patient will "get under" more quickly. It is a fact which is all too little appreciated, that in the first five minutes of anesthesia the sense of hearing is abnormally sharpened. The tinkling of an instrument against glass sounds like a bell, the scraping of a chair like a thunder clap. When the anesthesia is deep enough, the arrangements are completed. The legs are wrapped in blankets and strapped to the table, and the arms are folded on the chest, as in Fig. 122, or adjusted by the side of the body in such a way, that their outer edges do not lie unprotected on the edges of the table lest there result a paralysis of the ulnar nerves from pressure.

* In the so-called "Trendelenburg position" the foot end of the operating table is raised. Thereby the intestines gravitate toward the upper part of the abdomen, and this makes the approach to the pelvic cavity easier.

The final preparation of the field of operation varies in different hospitals. It is made either by one of the assistant surgeons, the instrument nurse, or the circulating nurse. Neither is there any uniformity in the method of preparation. In most hospitals, the shaving and washing of the abdomen had been done on the previous day, and the skin had been protected from gross contamination by a sterile towel which now is lifted off by the circulating nurse who must take care not to let the unsterile edges of the towel touch the skin.

The skin itself is wiped off with sponges soaked in ether in order to remove all grease. In some institutions, this is preceded by benzine. In any case, it is most important not to let benzine or ether run down toward the back where these can not evaporate and may produce very annoying skin burns. The ether is followed with equal caution by alcohol and this again by the antiseptic solution in vogue at the particular hospital, namely, either tincture of iodine (2 to 3 per cent) or picric acid (5 per cent). Special attention is required for the folds about the navel and above the symphysis. Particularly in the latter region the nurse should remember that the folds of the skin naturally run in a *transverse* direction, and that she must paint the abdomen in this direction if the antiseptic is to penetrate into all creases of the skin.

Two coats of this paint are better than one. One may occasionally see a nurse wash off the iodine or picric acid with alcohol *immediately* after applying it. The reason for such a procedure is difficult to understand. After all, it takes an appreciable length of time for the antiseptic used to penetrate into the skin and destroy the bacteria which may be in deeper layers; and the hasty removal with alcohol defeats the very purpose of the disinfection. There is practically no danger of irritation from the antiseptic solution so that the final application of alcohol appears wholly irrational.

For vaginal operations, the patient is put into the so-called "lithotomy position" (Fig. 123). The hips must be 1 inch beyond the edge of the table. The hollow of the back must be supported by a firm pillow, and the uprights, to which the feet are strapped, must be as high as possible, else the posture will cause a severe backache which may last for many days. The arms should be secured in a leather sling which holds them

comfortably against the chest. Never should the arms be brought above the head because this may lead to paralysis.

The cleansing of the operative field requires thorough washing with soap and water. The external genitals are so complicated that the usual dabbing with a cotton sponge soaked in liquid soap is entirely insufficient. Rather should the nurse slip on a clean glove and fairly energetically scrub

Fig. 123.—Lithotomy position for vaginal operation.

the vulva and its surroundings from above the symphysis to the rectum with large gauze sponges. This should take at least three minutes; a liberal supply of soap should be used, and it should be well rubbed into the skin. A *good lather is the best protection against infection.* The region around the anus should be cleansed last, and under no circumstances should a sponge which has been used in this locality, be permitted to touch any other part of the field. The soap is then rinsed off with warm sterile water, and this again with a bichloride or cyanide of mercury solution (1:1000). Or else, after the soap has been removed, the skin is painted with

picric acid solution. If the operation is to be performed under local anesthesia (see Chapter XXIII), the alcoholic picric acid solution must be omitted; if desired, a watery $1\frac{1}{2}$ per cent picric acid solution may be substituted.

Many operators desire vaginal douches to be given before the outer cleansing is commenced. Others prefer to swab out the vagina themselves with sponges soaked in some antiseptic solution.

The draping with special sheets is attended to by the instrument nurse or assistant surgeons after the cleansing is completed.

One word about pre-operative catheterization. It has been mentioned in the preceding chapter that in abdominal operations catheterization is done on the ward fifteen minutes before the time set; in vaginal operations it is done in the operating room before the cleansing is begun. In combined vaginal and abdominal operations, the time for catheterization depends on which of the two procedures will be performed first.

During the operation itself, the circulating nurse must hold herself in constant readiness for any service required. In most operating rooms there are specific duties for her to perform, such as taking and recording the patient's pulse at frequent intervals, counting soiled sponges, keeping the floor clean, etc. By watching the progress of the operation and paying attention to what is being said, she can often anticipate the surgeon's needs and in general contribute her share to the success of the operation. In particular, she should have a sterile hypodermic syringe in readiness, if stimulants are necessary, and, likewise, the outfit for hypodermoclysis or intravenous infusion if such are needed. The life of the patient may depend on her quick and systematic action. During the closure of the abdomen she will have to administer the proctoclysis mentioned on page 171. In all her work she must, of course, be careful not to contaminate any instrument, sponge, or dressing that may be used in the operation.

It is also her duty to have adhesive straps in suitable lengths ready to fasten the dressings over the incision, to pin on the binder when the patient has been lifted off from the operating table to the stretcher, and to have warm blankets in readiness.

On the transport back to the ward or room the patient must be carefully guarded against chilling which might be the starting point of a post-operative pneumonia, and protected from curious glances. The nurse should not forget to take a small pus basin along in case the patient coming out of the narcosis, vomits while on the stretcher.

THE INSTRUMENT NURSE

The instrument nurse is a very important factor in the smoothness and speed of any operation. Her resourcefulness and intelligence will make her a living part of the operating team rather than a mere mechanical adjunct. It is, however, impossible to learn operating or assisting at operations from books. Only actual experience and continuous practical repetition, supplemented by the study of books on operative surgery, can really teach us. For this reason, the technique of operations will not be touched upon in this chapter; for there is no standardization, and every surgeon carries out a technique of his own. Neither will the list of instruments for any given operation be specified as this, too, is subject to too many individual differences. Moreover, many operators prefer some special instruments. We can here, therefore, only mention certain general principles and offer some practical suggestions.

INSTRUMENTS

The nurse must be familiar with the names of the instruments called for by the operator. The easiest road to this specific knowledge will be a few hours devoted to the study of some complete illustrated instrument catalogue (Colp and Keller).

The instruments needed for abdominal gynecological operation are on the whole the same as used in general surgery. This applies, of course, to knives, scissors, artery and dissecting forceps, curved and straight clamps, sponge holders, needles and needle holders, towel clips, etc. In pelvic work, abdominal retractors of various designs (Fig. 124, *a*) are needed to keep the incision open and afford access to the abdominal cavity. The uterus is often lifted out from the pelvis by an "elevator" (Fig. 124, *d*) or a tenaculum or volsellum (Fig. 124,

b). Such tenacula or volsella (the term is interchangeable) may have only one prong or two or more prongs (Fig. 124 *b*). For large fibroids a corkscrew is occasionally used for this purpose. Ovarian cysts may have to be tapped before they can be removed from the abdomen. In such a case, a trocar with attached rubber tubing (Fig. 124, *c*) is needed. Pedicles (see page 78) or deep seated blood vessels are frequently ligated by means of an "aneurysm needle."

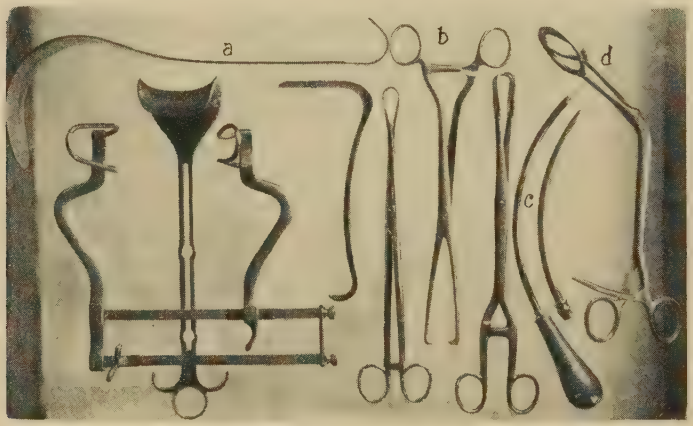

Fig. 124.—Some instruments used in abdominal operations. *a*, Abdominal retractors; *b*, tenacula; *c*, trocar; *d*, uterine elevator.

In vaginal operations, a "weighted speculum" (Fig. 125, *a*) and special vaginal "retractors" (Fig. 125, *b*) serve to expose the wound field within the vagina. Of the above mentioned tenacula, the one prong-variety is most advantageous. The uterine sound (Fig. 125, *e*), enables us to measure the length of the uterus. The cervical canal is dilated and thus the approach to the uterine cavity made possible, by means of dilators, of which those of Hegar (Fig. 125, *c*) and of Goodell (Fig. 125, *d*) are the more commonly used. Uterine curettes (Fig. 125, *f*) both sharp and dull, are manufactured in various sizes. Finally, appliances to "pack" the uterus (Fig. 125, *g*) exist in several designs.

The instruments mentioned and depicted, are used for the most common vaginal operation, that of scraping off the

diseased lining of the uterus. The procedure is called "curettage" (the term "curettement" is faulty). Where additional work, plastic or otherwise, has to be performed by the vaginal route, the general abdominal instrumentarium (with the exception of the abdominal retractors) is put in use.

This list is not complete because numerous special instruments have purposely been omitted so as not to confuse the beginner.

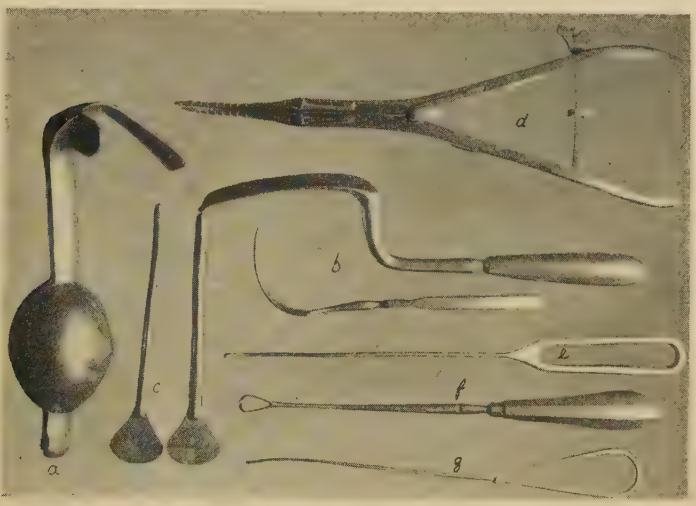

Fig. 125.—Instruments used for vaginal operations, particularly curettage. *a*, Weighted speculum; *b*, retractors; *c*, Hegar's dilators; *d*, Goodell's dilator; *e*, uterine sound; *f*, uterine curette; *g*, uterine packer.

NAMES OF OPERATIONS

With increasing practical experience the nurse will associate with the name of the operation scheduled the instruments likely to be needed and will thus better be prepared for her task. Here the meaning of some of the more common procedures may be briefly mentioned.

Laparotomy: Any operation by which the abdominal cavity is opened.

Suspension of Uterus: The shortening of the round ligaments (see page 58) whereby the retroflexed uterus is brought back into normal position.

Ventrofixation: Sewing of the uterus on to the abdominal wall.

Salpingectomy: Removal of one tube.

Oophorectomy: Removal of one ovary.

Salpingo-oophorectomy: Removal of tube and ovary on one side or, if "bilateral," on both sides.

Salpingostomy: Making an opening in the closed end of the tube.

Ovariotomy: Removal of an ovarian tumor.

Hysterectomy: Removal of the entire uterus.

Subtotal or supravaginal hysterectomy: Removal of only the body of the uterus; the cervix or part of the cervix is left behind.

Panhysterectomy: Removal of the entire uterus together with both tubes and ovaries.

Myomectomy: Removal of one or more fibroids.

Hysteromyomectomy: Removal of the uterus for fibroids.

Vulvectomy: Removal of the external genitals (clitoris, minor and major lips).

Perineorrhaphy: Repair of laceration or stretching of the perineum.

Anterior Colporrhaphy: Cutting out of a part of the overstretched anterior vaginal wall.

Trachelorrhaphy: Sewing up a tear in the cervix.

Amputation of the Cervix: Cutting off a part or all of the cervix.

Vaginal Hysterectomy: Removal of the uterus through the vagina.

PREPARATION OF THE OPERATING ROOM

The arrangement and organization of the operating room; its equipment; the preparation, assembling and sterilization of supplies, etc. are clearly outside of the scope of this book. The reader is referred to standard works on surgical nursing such as the one by Colp and Keller.

PERSONAL PREPARATION

In her classroom studies the nurse will have learned of the meaning of antisepsis and asepsis. As she advances to operating room work she receives practical instruction in attaining surgical cleanliness. She follows the rules prescribed

in her hospital as to scrubbing hands and forearms with soap and water, caring for her nails, and finishing her disinfection by immersion in "arm basins" filled with alcohol and antiseptic solutions before she may put on her sterile gown and gloves. All this need not detain us in this special work on gynecological nursing. A point of practical importance may here, however, be interjected. If the hands are not *thoroughly* dried with sterile towels and *well* powdered with sterile talcum, the glove will not slip on easily; and one occasionally sees a nurse pushing the glove over one hand with the bare fingers of the

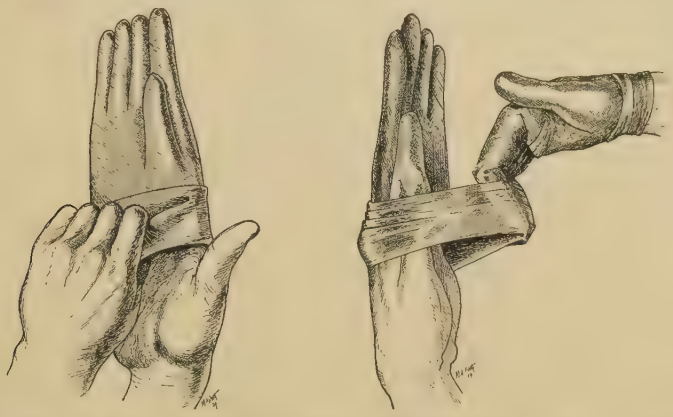

Fig. 126.—Method of putting on gloves. (Redrawn from Cragin, "Practice of Obstetrics.")

other hand. This, of course, breaks through the elaborate scheme of surgical cleanliness. The proper method of putting on gloves is illustrated in Fig. 126.

If, in combined operations, the vaginal operation has been done first, it is self-evident that gown and gloves must be changed before the laparotomy is commenced.

While it is customary for operating room nurses to wear caps which cover the hair completely, the wearing of a face mask by the instrument nurse is not insisted upon in all hospitals. This omission may lead to serious consequences. It is a well-known fact that in talking, coughing, or sneezing, and even in breathing through the open mouth, there is always driven out into the air a fine, often invisible spray consisting of minute droplets of mucus, and in these droplets there are

invariably present some of the bacteria of whatever kind that happen to be present in the mouth. The spray can be shown experimentally to extend for a considerable distance up to several yards, though ordinarily five or six feet is the limit of its reach. Any infection that may be present in the mouth, may thus be conveyed through the air; and as an extreme example a case reported by a French author may be quoted where, during operation, a woman acquired syphilis in her abdominal cavity from an assistant who had syphilitic ulcers in his mouth. It is for such reasons that surgeons and their assistants wear face masks during operation. To be sure, the nurse will not likely be near enough to the open wound, but she might conceivably with her unprotected breath infect instruments or suture material.

A FEW PRACTICAL HINTS

Crossen enumerates the following points which should be kept in mind by the instrument nurse.

"After putting on sterile gown and gloves do not touch any part of your gown except your cuff as necessary to draw glove over it.

Keep your hands clasped in front of you when not busy. Never let your hands hang at your side.

Remember, any break in technic on your part contaminates the whole operation and endangers the life of the patient.

Do not be afraid to call attention to a break in technic on the part of the operator. The surgeon may not tell you so but he thanks you.

Be honest about everything you do. This is the first quality required of an operating nurse.

Do not touch the outer edge of your table to move it. The outer edge is not considered sterile.

Do not let sheets, towels or dressings protrude over the edge.

Discard sutures that hang over the edge.

Do not touch the front of your table with the back of your gown. This applies to the instrument table as well.

Stand away from your table and reach for what you want.

Allow room to turn from your table to operating table without touching side or back of gown to table.

Be ready promptly at time scheduled.

Do not throw glass, catgut or sponges on the floor.

Do not work with needles and sutures after team is ready for towels.

Be ready to pass towels, powder and gloves. Do not wait to be asked.

After patient has been prepared, help to drape as quickly as possible. This is your work, and no time should be lost with patient under the anesthetic.

Have knife, scissors, sponges and sutures ready for surgeon.

Stand beside the operator or assistant as directed, and have your table placed in a convenient position for handling things.

Watch the progress of the work that you may be the better able to assist. Do not turn your back to the operating table.

Listen to what is being said, and catch any directions that may be given.

Think ahead and try to have things ready for the surgeon before he has to ask for them.

Know when the peritoneum is opened and have the warm moist rubber sheeting or pads ready to hand up promptly.

Keep the saline solution on your stand hot so that the abdominal pads do not get cool. Remember they are going into the abdominal cavity.

Moisten catgut, silk and silkworm-gut in saline when preparing it for the surgeon.

Ask for supplies before the ones you have give out.

Take hold of tractors when you see it is desired, and do not let go until clearly indicated.

Have a basin ready to receive large specimens and a cold-wet sponge to receive small ones.

After handing the surgeon the last suture needed, get the dressings ready.

Keep everything about the operating field as neat as possible. Spread down clean towels when needed.

Wiping the blood off the instruments is commendable if it is done so as not to interfere with the surgeon's use of them.

Suture material is expensive, especially catgut. Do not break more tubes than needed. But have extra tubes on the table, ready to be broken if needed.

Watch your needles to see that none are lost.

The sponge count is very important. Count the sponges when they are brought to your table and again as you pass them to the surgeon or assistant. Be sure that your circulating nurse counts them again after they are used and reports the count to the surgeon. Do this whether or not the surgeon asks for it—he may neglect to ask but he always wishes to know."

To these I would add:

Do not hand loose sponges after abdomen is open. Never put more than one sponge in a sponge holder.

At vaginal operations keep your instrument table behind and to one side of the operator and stand between him and the table.

QUESTIONS

1. How would you place a patient on the operating table?
2. How can you prevent post-operative backache?
3. How can you prevent paralysis of the arms?
4. How do you cleanse the patient for vaginal operation?
5. Why should a patient be wrapped in blankets on the way to and from the operating room?
6. What is curettage? Name the instruments needed for curettage.
7. Define laparotomy, suspension of uterus, hysterectomy, salpingo-oophorectomy.
8. Define perineorrhaphy, vulvectomy, vaginal hysterectomy.
9. Why should a nurse wear a face mask at operation?
10. Why should she keep saline solution hot throughout operation?

CHAPTER XXIII

ANESTHESIA

The art of administering anesthetics has, in America, developed into a regular specialty. Nurses who wish to enter this very promising field, will, in addition to their practical training, have to study special textbooks on the subject. We are here concerned only with the nurse who may have to *assist* at a narcosis, and should have at least some conception of the various forms of anesthesias employed in gynecology.

The object of surgical anesthesia is to render the operation painless. This can be accomplished by a *general narcosis* in which the patient is put into a state of unconsciousness, or by *local anesthesia* by which merely the field of operation is made insensible to pain.

GENERAL ANESTHESIA

Chloroform has entirely lost its former popularity in gynecological operations. Even in obstetrics where it is still used sporadically, it has largely been abandoned because its depressing effect on liver and kidneys represents a decided disadvantage.

Ether.—The "open mask-drop method" is still the most widely employed manner of inducing a general narcosis. The assisting nurse has to protect the lips and eyelids of the patient against the burning effect of any possible excess of ether by the use of vaseline, and provide moist towels to be put around face and mask. In addition she will have to record frequently pulse and respiration, as already mentioned on page 216.

Nitrous Oxide Gas.—This is administered by means of a special apparatus which also permits of addition of oxygen and, when needed, of ether.

Ethylene.—This, too, is a gas which, in combination with oxygen and, if necessary, ether, is administered by means of a rather complicated apparatus. Ethylene is highly inflammable. The nurse must be mindful of the possibility of an

explosion and keep any open flame (heated cautery, electric radiator, etc.) out of the operating room. Her duties as to recording the pulse of the patient are the same as when ether alone is administered.

LOCAL ANESTHESIA

The various methods of local anesthesia are, as a rule, carried out by the surgeon himself. Here, only the most commonly used will be discussed.

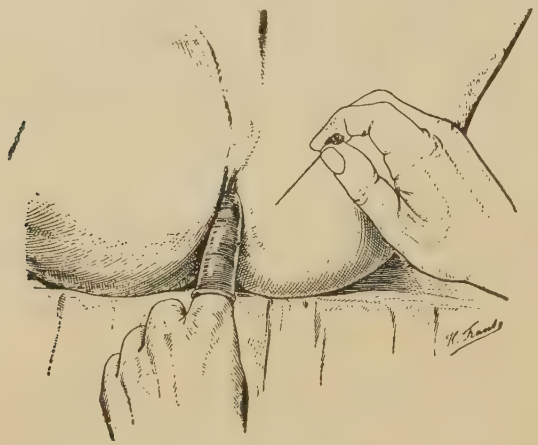

Fig. 127.—Point of injection for presacral anesthesia. (Labat.)

Infiltration Anesthesia.—This is employed only very occasionally in abdominal operations, while in vaginal operations its vogue is spreading steadily. It may be used in operations on the external genitals, including perineorrhaphy, within the vagina, on the cervix, and on the rest of the uterus, the latter embracing vaginal hysterectomies. The principle is the infiltration of the tissues with an anesthetizing solution. The anesthetic used is novocaine in a $\frac{1}{2}$ per cent sterile solution which is prepared by the operating room force. The quantity needed ranges from 1 ounce to 3 or 4 ounces, according to the extent of the operation. *To every ounce of the solution, three drops of the ordinary adrenalin solution* (1:1000) *are added.* Without this adrenalin, the novocaine

solution is very quickly absorbed into the circulation, and no pain relieving effect is produced. On the other hand, the added adrenalin not only increases the influence of the novocaine, but by constricting the blood vessels and rendering the involved area relatively bloodless, keeps the novocaine

Fig. 128.—The anesthetic is deposited at the anterior openings of the sacral bones. (De Takáts after Braun.)

solution longer in the tissues. Let it, therefore, be remembered that a local anesthesia with novocaine *always* implies the addition of adrenalin. The nurse, then, has to supply sterilized graded medicine glasses to measure exactly the amount of novocaine and a sterile medicine dropper to add the required number of adrenalin solution. There must also be prepared one, or better, two sterile all-glass syringes of a capacity of 20 cc. and several needles of about 2 inches in length.

Presacral Anesthesia.—This is a somewhat more complicated local anesthesia by which the nerves supplying the genital organs are "blocked," that is, surrounded by the anesthetizing solution, near their exit from the sacral canal. Fig. 127 shows the point where the needle is inserted, Fig. 128 the places where the anesthetic is deposited. The solution is the same as used for infiltration anesthesia, but the needles should be an inch or two longer.

Spinal Anesthesia.—In this form of local anesthesia the nerves are blocked *within* the spinal canal *before* they emerge through the openings in the spinal column. The instru-

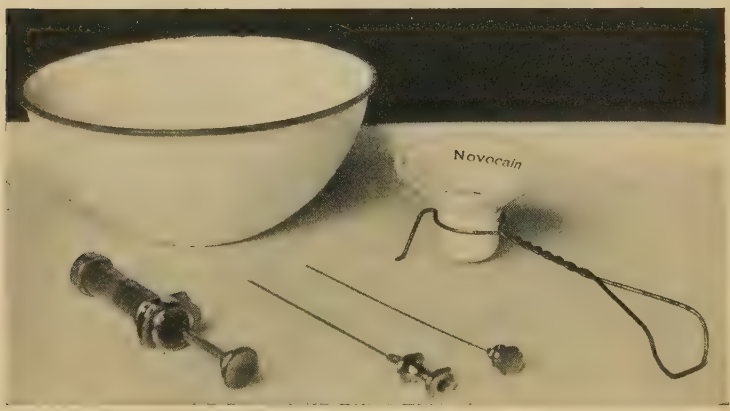

Fig. 129.—Instrumentarium for spinal anesthesia.

mentarium consists of a syringe of 10 cc. capacity and a lumbar puncture needle (Fig. 129), which are sterilized by the nurse and placed on a sterile tray. A small bowl with sterile *distilled* water is added because all implements must be rinsed off by the surgeon before use so as to remove any impurities of the water in which the instruments had been boiled.

The anesthetic in most common use is novocaine in a 5 per cent solution, combined with a very small amount of adrenalin. There are now sterile ampoules of this solution on the market; or one may prepare the solution by dissolving tablets in the distilled water within a small porcelain dish and boiling it

over an alcohol lamp supplied by the nurse. One tablet in one cc. of water gives a 5 per cent solution.

When the syringe is ready for use, the patient is made to sit up, fold her arms across the chest and bend her head forward, while the legs are kept straight on the table. In the accompanying photograph (Fig. 130), the patient is left uncovered so as to show the correct position more clearly. In this position, she is supported by the nurse who by pressure on the head, causes the patient to bend her body as far for-

Fig. 130.—Correct posture for spinal anesthesia.

ward as possible, thereby arching her back. It is now an easy matter for the surgeon who in the meantime has painted the back with tincture of iodine or picric acid solution, to find the right spot for insertion of the lumbar needle (Fig. 131).

This procedure, as a rule, is painless. Occasionally, a very sensitive patient may complain of the prick of the needle in the skin, and there is no objection to infiltrating the site of the injection with a drop or two of a $\frac{1}{2}$ per cent novocaine solution from an ordinary hypodermic syringe.

Fig. 132 shows the lumbar needle in place within the spinal canal. The stylet is now pulled out; and the syringe containing 3 cc. of novocaine solution is snugly attached to the needle.

By drawing up a few cc. of spinal fluid, the novocaine solution is thoroughly mixed and diluted and then very slowly

Fig. 131.—Insertion of lumbar needle.

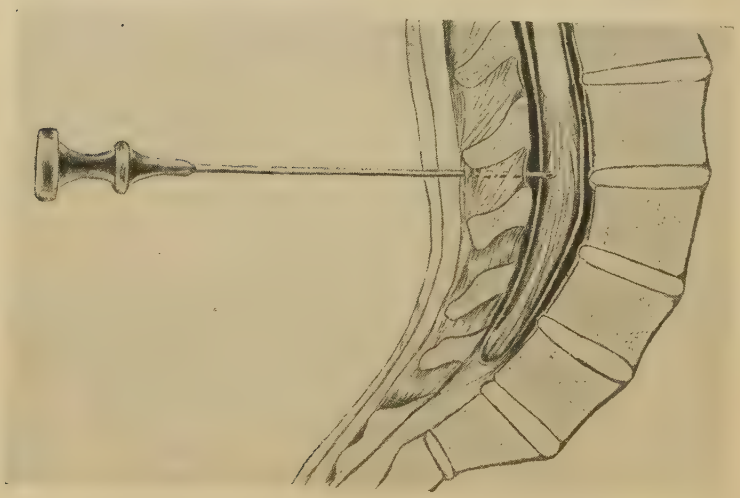

Fig. 132.—The needle in place in the spinal canal.

reinjected by a corkscrew-like twist of the piston (Fig. 133). The injection finished, the needle is pulled out, and the small

puncture hole in the skin closed with cotton and collodium to prevent seepage. The patient remains sitting, but no longer bent forward, for five more minutes, and is then laid down slowly.

From this description, the nurse's active participation in any spinal anesthesia has become evident. She has to sterilize the necessary implements, put the patient in the right position and hold her there during the injection, have cotton and collodium handy, and finally lay the patient down. During

Fig. 133.—Injection of the anesthetizing solution into the spinal canal.

the five minutes of waiting and afterward she has to keep very close watch on the patient's pulse, for in many cases the spinal injection is followed by a very marked lowering of blood pressure; and if the pulse becomes too weak or too slow, a hypodermic syringe with 10 drops of adrenalin for hypodermic or intravenous injection should be kept at hand.

QUESTIONS

1. What is a general narcosis? A local anesthesia?
2. What are the nurse's duties before an ether narcosis and during any narcosis?
3. What solution is used for local infiltration anesthesia?
4. What implements are needed for such a local anesthesia?

CHAPTER XXIV

AFTER OPERATION

Almost any operation, and certainly every major operation, is a physical endurance test and leaves the patient more or less chilled and exhausted.

What every patient needs first and foremost, after being returned from the operating room, is **external heat.** The bed must be warmed beforehand. No patient should ever be between cool sheets. Better still, she should be laid between warmed blankets, and warm water bottles should be placed suitably about the body and particularly the legs to bring the temperature up to normal as fast as possible. It is, of course, necessary to prevent burns which would not be felt until after the harm is done. That this common-sense precaution is often neglected, is proved by the numerous damage suits against hospitals for such carelessness of nurses. A valuable method of supplying heat to the depth of the body is proctoclysis in the form of the "Murphy drip." If, however, the solution is cool by the time it enters the rectum, it defeats its own purpose. The instructions regarding proctoclysis (page 171) should, therefore, be carried out in every detail. Where, as in the author's practice, proctoclysis had been given on the operating table, no further proctoclysis is needed. When the pulse is of good volume and the entire body covered with warm perspiration, external heat should not be administered unnecessarily long. This applies more particularly in very hot weather when artificial heat unduly protracted would cause more harm than good.

The patient next needs **rest.** The room should be darkened. The nurse should maintain quiet in the room and keep out, as far as possible, noise in the corridor. Relatives and friends should be requested to leave, and fresh air should be provided for without placing the patient in a draft.

Nausea and **vomiting** are common after any anesthesia. Generally speaking, ether causes more vomiting than a gas

narcosis; and a general anesthesia is more often followed by it than local anesthesia. By and large, women vomit less copiously than do men. The nurse must be in constant attendance as long as the patient is unconscious, for an attack of vomiting may come on suddenly and without warning, and the patient may draw the vomited material into her trachea and subsequently develop pneumonia. The nurse should not merely twist the patient's neck sideways to secure the vomitus in a towel or basin, but should turn head *and* shoulder to the side.

With or without vomiting, the patient soon complains of **thirst.** The time-honored custom is to give the patient cracked ice. This, like many other traditional procedures, is ill-advised. It produces dryness and a burning sensation of the lips and tongue, and only causes more vomiting and thirst. The proper thing is to give the patient first sips, later a little more copious drinks of tap or better hot water. This allays the thirst, and if the patient vomits, she thereby washes out her own stomach. Moreover, it is so much less painful to have something to vomit than to retch with the stomach empty.

Pain from the abdominal wound lasts, on an average, twenty-four hours. There was a time when surgeons were afraid to prescribe morphine. Nowadays, every surgeon orders morphine or codeine in specified doses to be injected if the patient complains of pain. Sometimes nurses are inclined to withhold such anodynes as long as possible, perhaps because they fear to produce a habit in the patient. This attitude is wrong. Pain, as we now know, tears down the resistance of the body. Moreover, morphine in the small quantities usually prescribed, serves to strengthen the heart. The pain after operations on perineum and anus is often very severe and quite out of proportion to the trivial nature of the operation. To let such patients suffer a minute longer than is absolutely necessary, is, to say the least, callous.

Purely vaginal operations such as curettage and amputation of cervix, as a rule, produce no pain, and even a vaginal hysterectomy is followed by very little distress. In this group of cases the nurse may first try to allay discomfort by placing an ice bag on the lower abdomen before asking

the attending surgeon for permission to inject morphine.

Very often it is less the wound pain than a severe **backache** that torments the patient for a day or two following the operation. This backache is caused by the position on the hard operating table, particularly if the natural curve of the back had not been properly supported by a pillow (Fig. 122). Occasionally, the shoulders and neck, too, ache from the pressure of insufficiently padded shoulder braces. The customary rubbing with alcohol hardly gives relief; but rubbing with oil of wintergreen or some other of the so-called "counterirritants" or "rubefacients," and application of an electric pad or warm water bag brings immediate comfort. This is but one of the many little things which a thoughtful nurse can do for her patient to alleviate the unavoidable distress following an operation.

Rapid pulse is an indication that the heart has been overtaxed. Therefore, many surgeons administer heart stimulants routinely. Personally, I prescribe injections of digifolin or some other digitalis preparation as long as the pulse rate is above one hundred. When the pulse is also weak or thready, an immediate coffeine-sodium citrate injection yields quick results. The proctoclysis or rectal tap, usually of soda bicarb. gr. xxx, glucose gr. xlvii, and water cc. 1000, which was mentioned at the beginning of this chapter, also, has a stimulating effect on the heart. All such medication requires, of course, previous consultation with the surgeon or interne.

The patient's **posture** in bed demands attention. She may, as a rule, assume any position which is comfortable to her. The old notion of keeping her flat on her back for a day or more inflicts unnecessary torture. As soon as she is conscious, she should have a pillow under her head unless she herself objects to it or unless she has lost so much blood that the head should be low so as to facilitate the circulation to the brain. There should also be a pillow beneath the knees in order to ease the strain on the abdominal incision. A sagging mattress is conducive to backache but can, to a certain extent, be remedied by a small pillow beneath the back.

In cases where drainage is desired, *Fowler's position*, that is, a half sitting posture, will be specified by the surgeon.

After perineal operations, the pillows supporting the knees should be rolled and tied (Fig. 102) so as to make them into firm bolsters. The legs are kept apart so that there is free access of air to the wound. The vulvar pad should not be held firmly against the wound by a tight T-binder because this is apt to add to the discomfort from the fresh incision. Instead, the pad should be placed on the bed beneath the buttocks so as to catch the wound secretions. An electric light bulb in a wire guard and protected, if possible, by a sheet of thick asbestos paper, will, if put in the bed between the legs, greatly relieve pain by constant warmth.

The **secretion of urine** is almost always reduced in the first twelve hours after an operation, particularly if the patient has been unable to retain any water. The following day, as a rule, it reaches its normal amount which, in women, is about 1000 cc. a day. Sips of hot weak tea with a little sugar but without cream, stimulate the action of the kidneys. Most patients are at first unable to void lying on their backs. They must, therefore, be catheterized. The first catheterization should be eight hours after operation and should then be repeated at eight hour intervals. *There is absolutely no objection to doing this oftener if the patient desires.* The importance of carrying out every detail of this procedure according to instructions (Chapter XV) must again be emphasized. It should be the ambition of the nurse to catheterize without causing pain or subsequent infection. If she is unable to obtain any or but very little urine, she should at once notify the attending physician, for anuria (page 116) may signify either a breakdown of the kidneys or an injury to the ureters.

As has been mentioned on page 163, I use a retention catheter in all cases where an operation has been performed on the vulva or perineum. This circumvents the necessity of catheterizing such patients, prevents incidental pain, and gives the wounds a chance to heal without disturbance. Retention catheters are also inserted after operations for bladder fistula. The success of such operations depends to a great extent on the proper care of the catheter by the nurse. The catheter should be properly fastened (Fig. 102) and the bladder irrigated with the specified solution every four hours day and night. Slipping out of the catheter or insufficiency of drainage

should at once be reported to the attending physician or the interne.

Voiding in dorsal posture is greatly facilitated if the back is supported by a pillow while the patient lies on the bed pan (Fig. 108). The sound of running water in an adjoining bath room and leaving the patient alone for a few minutes are well-known additional helps.

After voiding, and also after vaginal or perineal operations where there is considerable bloody discharge, the vulva must be cleansed by means of a "pitcher douche." For this purpose the patient lies on a douche or bed pan, with a pillow beneath the back to relieve the strain, and warm (100 to 105 F.) sterile water or saline solution (or whatever other solution is in vogue at the hospital) is poured over the vulva from a small sterile pitcher. As this irrigation would hardly cleanse the inside of the labia, the latter must be *gently* separated with gloved fingers while the water is poured out. After the irrigation, the free hand dries the wet parts *gently* with cotton balls held in a sterile forceps. Dabbing is better than stroking. Each ball is used only once and then deposited in a pus basin. Gentle touch will prevent unnecessary pain.

Not infrequently there comes a time—usually one or two days after operation—when the patient calls for the bedpan almost incessantly but voids only one or two ounces each time. The nurse who records this occurrence merely as frequent micturition, fails to realize that in such a case the bladder is overdistended and that only the overflow is expelled. Catheterization which yields a very large amount of urine, usually eliminates this very distressing condition permanently. Rarely is a second catheterization required.

The patient needs **sleep.** During the first night, the morphine given to relieve the acute wound pain, will secure sufficient rest. On the following nights there is still enough discomfort to prevent sleep. If there are no specific orders, let the nurse ask the attending physician for instructions.

In the matter of **food,** discretion must be used according to the nature of the operation. Here, too, the nurse had best inquire into the wishes of the physician. Generally speaking, very hot or very cold (but never iced) drinks of water are desirable for the first twelve hours. Then hot tea, fruit

juices, charged water, etc., are in order. Some patients complain of gas after drinking orange juice. The preference of the patient may well be consulted. Milk in any form is unsuited until after the bowels have moved. Buttermilk, on the other hand, pure or diluted, is relished by most patients. The guiding principle during the first two or three days should be to supply the body with much fluid, irrespective of its nutritive value. Later the actual caloric contents of "soft," and "regular" diet have to be considered.

Gas pains occur about thirty-six hours after operation. The intestines which had been paralyzed for the time being by the anesthetic, handling during operation, and by the pre- and post-operative use of opiates, now "wake up," that is, their muscles begin again to contract. This contraction, however, does not take place throughout the entire intestinal tract, but takes the form of spasms at different places. The air imprisoned within these places of constriction distends the intestinal tube which tries to overcome the blocking of the passage by feeble but ineffectual contractions. Hence the colicky pain which, together with the distention of the abdomen, causes much suffering. The proper relief is by means of an enema. The technic of the latter is described in Chapter XVI. I merely wish to repeat here that a rubber catheter is preferable to a colon tube or enema tip. Of the enema fluid itself a large variety are in use and determined by the preference of the physician. If no specific orders are given, a saturated solution of magnesium sulphate will be found very satisfactory because of its relaxing effect on intestinal spasms. The action of the enema is often assisted by an intramuscular injection of pituitrin.

Bowel function requires a laxative which is given, on order of the physician, from two to four days after operation. The idea that there can be no fecal matter because the patient has not eaten solid food for days, is fallacious.

The change of dressings is in the hands of the physician. The patient usually looks forward to this procedure with a great deal of dread, and the nurse should dispel her fears by assuring her that she need not anticipate pain.

Bed exercises should be a part of the regular postoperative routine. As early as the second or third day after operation

the patient should move her feet (but not her legs) up and down, then rotate them first to the right, then to the left, and finally claw her toes, while the feet themselves are held rigid (Fig. 134). This improves the circulation materially and tends to strengthen the muscles both of the feet and calves so that the patient will be better able to use her legs when she leaves her bed.

Abdominal bandages are no longer in general use. In former days when the closure of the abdominal incision was

Fig. 134.—Foot exercises.

less perfect than it is today, they were a necessity to guard against hernia. Nowadays they may still be needed where wound healing was disturbed or where the abdominal walls are feeble and relaxed.

SUMMARY

Merely as a general outline, the author's routine post-operative orders are here reproduced. It goes without saying that these orders are often changed to fit the exigencies of a special case.

(*a*) *DAY OF OPERATION.*

1. Morphine grain $\frac{1}{6}$ hypo- as soon as patient complains of discomfort.

2. Thereafter morph. grain $\frac{1}{1\frac{1}{2}}$ hypo- *every* four or five hours unless patient is asleep.

3. Cold tap water by mouth freely, irrespective of vomiting.

4. No ice or ice water.

5. May have pillow under head, if desired. May be turned on either side.

6. Urine every eight hours. If unable to void, catheterize with glass catheter and irrigate bladder with silver nitrate sol. 1:3000.

7. Digifolin or some other digitalis preparation m xv hypo- every six hours.

8. Caffeine-sod. benzoate one ampoule for weak pulse p. r. n. Inform interne or operator.

9. All orders continued through first night.

(*b*) *FIRST DAY AFTER OPERATION.*

1. Morphine grain $\frac{1}{1\frac{1}{2}}$ hypo- every *six* hours—only if patient is in pain.

2. Hot tea or coffee, without cream, but sweetened if desired. Tap water, ginger ale, seltzer, or vichy, if desired.

3. Urine every six or eight hours, or oftener, if patient desires. Catheterize and irrigate bladder as ordered, if needed.

4. Sulphonal or veronal grain V. at bed time.

5. If disturbed by gas, give saturated mag. sulph. enema oz. 3 through soft rubber catheter; this may be syphoned off after one-half hour if patient is unable to expel it, and may be repeated p. r. n.

(*c*) *SECOND DAY AFTER OPERATION.*

1. No more morphine or other opiates.

2. Mag. sulph. enema, as ordered above, repeatedly for gas pain.

3. In addition to liquids ordered above, give buttermilk and water equal parts, soup, milk toast, if desired.

4. Sulphonal or veronal grain v. at bed time.

(*d*) *THIRD DAY AFTER OPERATION.*

1. Cascara grain iv. or castor oil oz. 1 early in morning.

2. Mineral oil oz. $\frac{1}{2}$ night and morning.

3. Mag. sulph. enema four or five hours after laxative.

4. Soft diet.

QUESTIONS

1. Why, and how do you apply external heat after operation?
2. What special precautions do you have to take?
3. What are the common complaints after operation?
4. How can you mitigate them?
5. What can you do to relieve backache?
6. What would you do if the patient's pulse is rapid?
7. How should the patient lie in bed after operation?
8. How would you arrange her position after operation on the perineum?
9. How often would you catheterize a patient who can not void?
10. What would you think and do if thereby you do not obtain any or only very little urine?

11. How can you assist the patient in voiding spontaneously?
12. What would you do if a patient voids small quantities at very frequent intervals?
13. How can you relieve the ordinary vomiting after operation?
14. When do gas pains first occur? What can you do to give the patient relief?
15. What food would you give the patient on the first, second, and third day, respectively, after laparotomy?

CHAPTER XXV

POSTOPERATIVE COMPLICATIONS

Not always does the postoperative convalescence run the usual course which was discussed in the preceding chapter. Occasionally certain complications set in which threaten the patient's life. The nurse must be familiar with the principal signs and symptoms of these complications, for, as a rule, she is the first to notice any danger signals, and by reporting them promptly to the intern or attending surgeon, she may be able to avert disaster. She must also be prepared for emergency treatment pending the arrival of her medical superiors.

The following complications have to be considered: shock, hemorrhage, acute dilatation of the stomach, intestinal obstruction, infection, thrombosis and embolism.

SHOCK

Shock is an acute and profound depression of the patient's vitality. It has many causes chief of which are: prolonged anesthesia, great extent and severity of the operation, loss of blood, chilling before, during, or immediately after operation, excessive handling of the organs within the abdominal cavity. It may set in on the operating table or soon after the patient has been returned to bed. The pulse becomes very rapid, irregular, thready, barely perceptible at the wrist. Respiration is rapid and shallow. The temperature is lowered below the normal. The face is pale and expressionless; the skin is cold and clammy. The eyes are dull; the pupils are dilated and react very sluggishly, if at all, to light. The patient remains unconscious or, if awake, lies in a state of stupor. Life seems to be ebbing away, and one has the impression of an impending crisis.

In this most serious condition, no time can be lost, and energetic treatment must be instituted without delay. This treatment, generally speaking, consists of stimulation and heat, and, except in desperate cases, is usually successful.

While waiting for the doctor, the nurse should at once apply external heat in the manner described in the preceding chapter. Precautions against burns should, however, not be neglected in the excitement. Next, the foot end of the bed must be raised so that the blood may more easily flow to the brain. The extremities should be bandaged as far as the trunk in order that more blood may be available for the vital centers, the brain, heart, and lungs. In doing this, the nurse should, as far as possible, avoid chilling, of the exposed surface. A sterile hypodermic syringe and coffeine-sodium benzonate ($3\frac{1}{2}$–7 grains) strychine grain $\frac{1}{30}$, and adrenalin solution should be in readiness but no injection should be given without the doctor's orders. The reason is this that shock is sometimes the result of hemorrhage, and as in such a case the medicinal treatment would be quite different, the nurse has to wait for the exact diagnosis to be made.

Finally, preparations must be made to administer proctoclysis, hypodermoclysis or intravenous infusion without delay according to the physician's decision.

From the foregoing it is obvious that the nurse has a great responsibility once the signs and symptoms of shock have become evident, and that a favorable outcome depends, to a large extent, on her prompt and purposeful action.

HEMORRHAGE

Postoperative hemorrhage may be either external or internal.

External hemorrhage is characterized by bleeding from the vagina. A certain amount of bleeding follows any vaginal operation. If it is abundant, it should at once be brought to the attention of the intern or surgeon in charge. It may be due to failure to secure the vessels of cervix or vagina, and may be overcome by the insertion into the vagina of a firm pack. The nurse, therefore, should prepare a sterile vaginal speculum (Fig. 79), a dressing forceps (Fig. 80) and gauze packing such as is kept in every hospital for such emergencies. Sterile roller bandages may be used as a makeshift, if no other gauze is available.

Internal hemorrhage means bleeding into the abdominal cavity from a vessel that had not been ligated at all or only

insufficiently during the operation. The symptoms, as a rule, manifest themselves more gradually than those of shock, and may not be noticeable for an hour or more after the patient has been put to bed with a good pulse and apparently otherwise in a satisfactory condition. Then the pulse becomes progressively more rapid and at the same time weaker and fluttering, and the temperature falls below normal. Face and lips are pale. In contradistinction to the patient in shock who is listless and apathetic, the patient who is bleeding internally, is restless and throws herself from side to side. Her respirations are fast and superficial; she gasps for breath and yawns frequently, a symptom which is termed "air hunger," asks to have the windows opened, and feels as if she were being smothered. She complains of dizziness, is unable to see; there is pain in the regions of the heart and in the abdomen, and fear of approaching death.

In the worst cases the end may come before an intern has been summoned. In less desperate cases, prompt action may yet save the patient's life. The treatment consists of the measures used to combat shock, plus the ligation of the bleeding vessel, with this difference that *no stimulation of any kind should be given until after the vessel has been secured.* As this requires the re-opening of the abdomen, the surgeon and the operating room force must be notified at once. Pending the necessary preparations to be completed, an ice-bag should be placed on the abdomen where it is not covered by dressings, and a hypodermic injection of morphine grain $\frac{1}{4}$ should be made ready to be used at the instruction of the surgeon.

ACUTE DILATATION OF THE STOMACH

Vomiting is a common sequel after operations. It seldom lasts longer than twenty-four hours and, as a rule, is not excessive. In rare cases, vomiting persists and increases in severity on the second or third day after operation. No fluid is tolerated by the stomach, and large quantities, out of all proportion to the amount taken, are vomited. The fluid either runs out of the mouth in a more or less continuous stream, or, if mixed with gas, is expelled with considerable force. The pulse becomes rapid and weak, the respiration

fast and superficial, while the temperature, as a rule, remains normal. The face is pinched, the lips cracked, and the tongue dry and deep red; and often there are small bleeding points in the back of the throat. The region of the stomach is distended, and there is a constant gnawing pain in that area. The patient has the appearance of a seriously sick person.

This alarming complication is termed "acute dilatation" of the stomach. We have known of it only a little more than twenty-five years, and even now we do not know its exact cause. We do know, however, that the patient may die from exhaustion unless prompt measures of treatment are instituted. These are threefold, namely, (1) the organism which has been depleted, must be filled up with fluid; this is accomplished by means of proctoclysis, hypodermoclysis, and intravenous infusion. (2) the stomach must be washed out thoroughly through a stomach tube or a very thin tube inserted through the nose, a "nasal" tube, and this may have to be done repeatedly. (3) the position of the patient must be changed frequently; she should be made to lie on one side or the other, or better still, on her stomach unless there are special objections.

Until the dilatation of the stomach is definitely relieved, no food or water should be given as it would merely make the condition worse, but the patient may rinse her mouth frequently so as to mitigate her discomfort.

INTESTINAL OBSTRUCTION

Within thirty-six or forty-eight hours after any abdominal operation there is, as we have seen in the preceding chapter, a more or less marked distention of the abdomen with considerable gas pain. Both distention and pain disappear after the first flatus or stools have passed. In more severe cases our usual attempts at evacuating the bowels fail. We then speak of intestinal obstruction or *ileus*. The abdomen becomes enormously distended,* the pain is constant and excessive, and there is loss of appetite and nausea. Vomiting sets in which becomes progressively worse and, in many cases, contains fecal matter. We call this appearance of bowel contents

* The technical terms for gas distention of the abdomen are meteorism or tympanites.

in the vomitus "reversed peristalsis." Pulse and respiration are rapid, while the temperature becomes subnormal. The tongue is dry and the general appearance is that of a serious illness. The longer this condition exists, the more doubtful is the outcome because the poisons created by the decomposing and fermenting material in the intestines are absorbed into the circulation and produce a general blood poisoning, a *toxemia*.

There are three different kinds of ileus, namely (1) mechanical, (2) paralytic, (3) septic ileus.

In the mechanical ileus the bowel is obstructed by kinking or by constriction due to an adhesion.

The paralytic ileus owes its origin to the inability of the intestines to recover their power of contraction. This may be due to prolonged anesthesia, to extensive handling of the intestines during operation, to their exposure to the air on the operating table, or other factors not yet fully understood.

Septic ileus is a sequel of peritonitis and is discussed under that heading.

The object of treatment of mechanical and paralytic ileus is to secure an open passage for gas and bowel contents. This may require re-opening of the abdomen in order to straighten out a kink or sever a constricting adhesion, or else to make an opening in the intestine through which gas, fluid, and solid material may escape. In other cases, intramuscular injections of pituitrin together with specified enemas may be prescribed by the physician. In every case the stomach must be washed out and the waning strength of the patient supported by hypodermoclysis; and consequently, the nurse must prepare the implements for lavage and for subcutaneous injection of saline solution.

INFECTION

An infection is caused by the invasion of pathogenic bacteria (Chapter III). It may be either local or general.

A local infection interferes with the healing of the wound. It manifests itself in a moderate elevation of temperature, up to 102 F., while the pulse remains fairly normal; there is also local pain, headache, loss of appetite, and general discomfort. The treatment of this complication which arises about four days after operation, lies in the hands of the surgeon.

In **peritonitis** the infection is at first localized but soon spreads over the entire surface of the peritoneum. Two or three days after operation the temperature begins to mount and gradually reaches 103 and even higher degrees. Simultaneously the pulse becomes quite rapid; in fact, on the graphic chart the pulse curve is always considerably above the temperature curve. This relation of pulse and temperature is very significant. There is a great deal of pain first in one place, later throughout the abdomen. The latter is distended and extremely tender, even on the lightest touch. The abdominal muscles are held rigid, and the patient draws up her knees in an effort to relieve the tension. The bowels are locked and very little, if any, gas or fecal matter can be obtained by enemas. In rare cases diarrheas occur without reducing the meteorism. The extreme distention interferes with breathing, and the absorption of decomposing matter leads to toxemia. Vomiting is an early symptom. The vomitus is dark in color and foul smelling. Not infrequently a persistent hiccough adds to the distress. The facial expression is anxious, and the strength of the patient is waning rapidly. A dry, dark-brown tongue is a particularly ominous sign. Urinary secretion decreases and, in severe cases, may cease altogether.

The outcome of this dangerous complication depends on the severity of the infection and the resistance of the patient. To strengthen the latter is, therefore, the object of treatment. There is as yet no unanimity as to the best method of treatment. Some surgeons make multiple incisions in the abdominal walls through which they thoroughly irrigate the peritoneal cavity, and occasional recoveries have been reported. The abdominal skin may be covered with icebags so as to restrain the spread of the infection and reduce the pain of distention. Lavage of the stomach, hypodermoclysis and intravenous infusion are resorted to with the idea of removing or diluting poisonous material. Blood transfusion has been recommended as a means of improving the bodily resistance of the patient. Stimulation of the overworked heart by suitable drugs, and physical and mental rest by means of morphine are indicated. Food or water by mouth is, as a rule, not retained. The same is true of rectal taps. Small

saline or glucose enemas, of 3 to 5 ounces, may be absorbed, if given at intervals of three hours.

Sepsis or **septicemia,** in English, blood poisoning, is produced by the invasion of bacteria and their products into the blood stream. It is generally ushered in by a chill, after which the temperature may rise as high as 105 F. The fever, however, subsides for a short time each day and then mounts again, in contradistinction to peritonitis where the temperature remains high throughout the course of the infection. The pulse is always rapid and small, and respirations are correspondingly rapid. There is also nausea and vomiting, scanty and highly-colored urine and, not infrequently, diarrhea. Abdominal distention is absent. At the peak of the fever such patients seem to be surprisingly well. With their heightened color and glittering eyes they present a picture of apparent well-being, a "euphoria" which must not deceive the nurse as to the seriousness of the situation. We must admit that we have no specific means of combating the infection in the circulating blood. Only her own power to resistance can save the patient. During the chill, external heat must be applied and water by mouth or subcutaneous injection be administered. The discomfort of fever may be reduced somewhat by "temperature sponges." A few successful cases make me hope that protein therapy (Chapter XIX) in the form of milk injections or blood transfusions, and free access of fresh air by day or night, irrespective of the season of the year, may whip up the natural defenses of the body to such an extent that the invading germs may be overcome. The final result, however, depends on the deadliness of the causative bacteria and on the promptness and energy with which these remedial measures are instituted at an early stage of the infection when the body is still capable of rallying its defensive means.

POSTOPERATIVE PNEUMONIA

Bronchitis, pleurisy or pneumonia may complicate convalescence if a weakened patient is unduly exposed before, during, or after operation. As far as the nurse is concerned, the logical conclusion is to protect the patient carefully against chilling on the way to and from the operating room.

THROMBOSIS AND EMBOLISM

Thrombosis or thrombophlebitis is a painful swelling of the leg, accompanied by a rise in temperature. To understand its origin and seriousness, we must, first, recall that, under normal conditions, the blood circulates so rapidly through all parts of the body that the many cells and other particles which swim in the blood stream, cannot settle in the fluid. If, however, the current in any part of the body is slowed down very much, the circulation in the veins (which is always slower than in the arteries) will become greatly retarded; and just as a sluggish stream lets mud sink to the bottom, so here some of the formed elements within the blood, notably the so-called "blood platelets," drop down and form, on the inside of the affected vein, a little mound of soft jelly which constantly grows larger from added sediment as the feeble blood current passes over the obstacle.

This clotted blood which occludes the vein more or less completely, is called a *thrombus;* the occurrence of a thrombus is termed "*thrombosis.*"

It seems that the slowing down of the venous circulation produces a thrombus *only* if at the same time the wall of the vessel has been irritated either by a mechanical injury, such as a bruise, or by an infection. The term "phlebitis" is derived from the Greek word *phlebs*, meaning vein, the ending—*itis* denoting inflammation; and we can now define thrombophlebitis as an inflammation in a vein which has led to the formation of a thrombus.

The thrombus is located most often in the groin, at times, under the knee, and may be felt as a hard cord or oblong body. The blood flowing through the arteries into the leg, finds, on its return, the passage in the saphenous, femoral, or iliac veins blocked and must seek its way laboriously through many small, superficial channels. As a result, the leg becomes greatly swollen and the skin takes on a white, glossy appearance. From its former frequent occurrence after childbirth the condition was called "milk leg" because it was—erroneously—assumed that the swelling had something to do with suppression of milk.

Even before the enlargement of the limb is fully established, the patient has a good deal of pain which is intensified by

movements, and there is always a rise in temperature which may go as high as 102 or 103 F.

When the new outlets for the return flow have become sufficiently widened, the swelling very gradually subsides. Simultaneously, the thrombus is slowly "organized," that is, a part of it is absorbed and the rest, by subtle changes, is incorporated into the wall of the vein where it may persist, for a very long time, as a firm prominence.

This gradual disappearance of the thrombus and the slow readjustment of the circulation which consumes three or more weeks but ends, eventually, in a spontaneous cure, does, however, not prevail in all cases. In some instances, the blood stream, before the occlusion if complete, breaks off a small part of the clot and carries it along toward the heart. The detached piece which is called an *embolus*, may stick in one of the valves of the heart or pass through the latter and lodge somewhere in the lung. In the first case it causes instantaneous death; in the second case it is nearly always fatal by causing a septic pneumonia. This accident is called *embolism*.

Can this complication which is so very dangerous and even in its mildest form causes much pain and delays recovery for a long time—can this complication be prevented?

Fortunately, there are certain precautions which *may* forestall the development, and certain details of management that may hasten the cure of an already established thrombosis. In both these matters the nurse has an important part to perform.

As patients with varicosities, that is, enlarged veins in the legs, are apt to develop thrombosis, the nurse should bandage the legs from the feet to the middle of the thighs tightly with rolled bandages of flannel or some elastic material before the patient is sent to the operating room. The operating table should be well padded under the knees so that the vein suffers no undue pressure, if the foot end of the table is lowered. After operation, the patient's position in bed should be changed frequently unless some definite reason exists for not disturbing her; and if her condition does not forbid it, foot exercises (page 238) should be instituted as early as the day after the operation. I also believe that injections of some digitalis preparation before and for a day or two after an operation serve to

prevent thrombosis, and I find that many operators share this opinion. The hope of eliminating the complication by getting the patients out of bed as early as seven days after a major operation has not been borne out by large statistics. This, after all, is not surprising; for, while its outward manifestations (pain, swelling) may not appear for two or three weeks, the thrombus itself has begun to form within the first few days after the operation.

If, after an operation, the patient complains of pain in one or both legs (for thrombosis may occur in both sides at

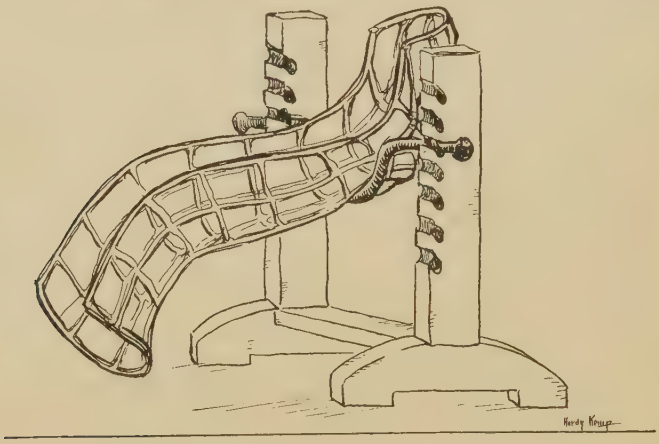

Fig. 135.—Appliance used in thrombosis.

the same time!), the affected limb must at once be elevated and put at complete rest. For this purpose it may be placed on pillows, but these have the disadvantage, that the leg easily slips off or can often be held in position only by muscular effort which, at this time, should be avoided. Moreover, the foot, too, must be supported lest the position become too fatiguing, and the weight of the bed cover on the foot must be taken off by a "cradle." Much more satisfactory is a simple appliance (Fig. 135) which I designed some years ago, and which the intelligent nurse can easily improvise from the fracture supply room.

An ice-bag on the groin or, on the contrary, heat may be applied according to the doctor's direction, but sometimes

morphine or the like will be needed to relieve the pain. Under no circumstances should a sore leg be rubbed or massaged as long as there is the slightest suspicion of a thrombosis. In some cases, the behavior of the pulse may point toward the right diagnosis. Mahler, of Amsterdam, noticed that prior to the appearance of thrombosis, there was often a steadily increasing rapidity of the pulse; but this so-called "*sign of Mahler*" is not constant enough to be of great practical value. The accompanying fever needs no special treatment. It disappears after two or three days if the leg is kept perfectly quiet.

A patient immobilized in bed by her illness requires particularly careful nursing. The raising of the leg while the cotton in the wire splint is changed, the lifting on and off the bed pan, the daily bodily care—all these require gentleness and caution. In the case of stout women it will tax the resourcefulness of the nurse to secure comfort and prevent bed sores.

Even after discharge from the hospital, patients must expect for some time pain and swelling of the affected limb, if much walking is done. They should be advised to wear elastic stockings.

QUESTIONS

1. Name some of the postoperative complications.
2. How would you recognize shock?
3. What would you do, pending the doctor's arrival?
4. How would you distinguish internal hemorrhage from shock?
5. What would you do until the doctor arrives?
6. How would your recognize ileus?
7. Name the signs of wound infection.
8. Why should you always look at the tongue to see whether it is moist or dry?
9. What significance has a rapid pulse associated with high temperature?
10. What is a milk leg? What is its technical name?
11. Why is milk leg so very dangerous?
12. What special precautions must you take in caring for a patient with this complication?

CHAPTER XXVI

A SHORT HISTORY OF GYNECOLOGY

Reference to historical events has been made here and there in this book. In the present chapter a more systematical, though brief survey of the most important milestones in the evolution of gynecology is presented.

From the earliest days of civilization, as far back as 2200 B. C., fragments of gynecological lore have come down to us from Egypt and India. In ancient Greece the art of healing reached a remarkable degree of development under the leadership of **Hippocrates** (born 430 B. C.) who is justly called the Father of Medicine. This great man and some of his pupils left writings behind which deal extensively with diseases of women. We may well remember that many of the technical terms which we use to-day, were coined by Hippocrates; and we still marvel at the accuracy of his observations and the extent of his experience though we realize that medicine in his day, of necessity, was crude and incomplete.

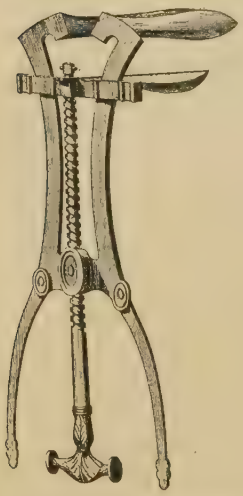

Fig. 136.—Ancient Roman speculum. (Original in the Library of St. Louis University School of Medicine.)

The influence of Hippocrates extended well over 2000 years. His teachings were carried by Greek physicians to Rome in the last century before our era, and later vigorously promulgated particularly by **Galen** (born 131 A. D.) whose authority in the field of medicine remained unchallenged throughout the following centuries until the close of the Middle Ages. Though in the course of time the critical attitude of Hippocrates toward the manifestations of disease was lost, and medicine deteriorated into a mass of fanciful

and superstitious beliefs, yet there is no doubt that a good deal of gynecological work was done in those days. Witness, for example, the vaginal speculum found in 1819 in the ruins of Pompeii, the well-known city in southern Italy which had lain buried beneath the ashes from an eruption of Vesuvius since the year 79 A. D. (Fig. 136).

The Middle Ages, also called the Dark Ages, lasted until the middle of the fifteenth century. The invention of the printing press in 1439 which facilitated the wide dissemination of knowledge, and the conquest of Constantinople by the Turks in 1453 which drove the scholars from that city into the Occident, ushered in a new movement of culture, first in Italy and later in the rest of civilized Europe. It is in this epoch of the Renaissance when Art and Science awoke to new life after a slumber of many centuries, that the real history of gynecology begins.

Andreas Vesalius (1514–1565), professor in Padua, was the first to question the authority of the ancients, especially Galen, and to put accurate facts in the place of fantastic notions. He applied himself diligently to the dissection of human bodies, described correctly the external and internal genitals in the female, and gave, in particular, an excellent picture of the uterus with tubes and ovaries and their blood supply. In the ovaries he found and described the yellow bodies or corpora lutea (see page 28).

His pupil and successor in the University of Padua was **Gabriele Falloppio** (1523–1562) (Fig. 137). Aside from many other anatomical discoveries, he described in all details the analogy between clitoris and penis, and the round ligaments and their course through the inguinal canal into the labia majora, and even suggested the possibility of hernias along their course. He gave the name to vagina and placenta. His chief accomplishment was the detailed description of the tubes which still bear his name (page 23).

Ambroise Paré (1517–1590) of France, rose from humble beginnings to the rank of the most famous surgeon of his generation. His claim to immortality lies in the ligation of bleeding vessels which he was the first to employ. Gynecology owes this man a great debt. We know of him that he per-

formed a vaginal hysterectomy for prolapse, and we find in his writings the picture of a vaginal speculum (Fig. 138) constructed by him which is remarkably similar to the Roman speculum (Fig. 136) of which, of course, he could have had no personal knowledge.

The seventeenth century brought three great events in the field of medicine: the discovery of the circulation of the blood,

Fig. 137.—Gabriele Falloppio. (Garrison.)

the invention of the microscope, and the recognition of the function of the ovaries.

Regnier de Graaf (1641–1673), of Delft, in Holland, (Fig. 139) gave us a precise description of the follicles which bear his name (page 26). He also realized that these follicles contained what he, for the first time, called ova, and that these ova could escape only through a tear in the follicle; the egg was then transported through the Fallopian tubes into the uterus. The human egg itself, however, was seen for the first time in 1827 by Baer, of Koenigsberg, in Prussia. The type of microscope used by de Graaf, is shown in Fig. 140.

John Hunter (1728–1793), of London, was the pioneer in the realm of scientific surgery. The amazing amount of research done by this remarkable man embraces studies of the maternal and fetal circulation. That even the great men of this earth may sadly err, is proven by Hunter's attitude in the problem of syphilis and gonorrhea. Ever since the end of the fifteenth century when syphilis first made its appearance as a world-wide epidemic, the two diseases had been considered

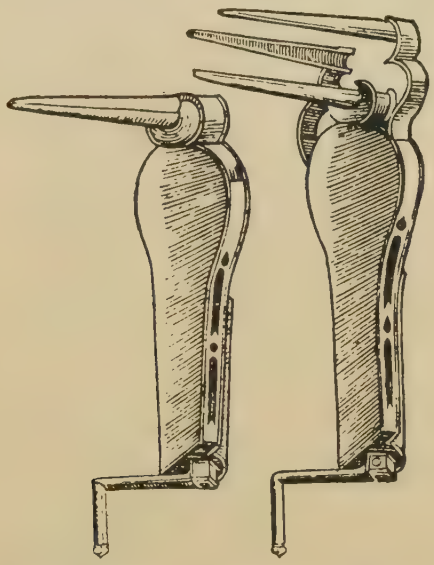

Fig. 138.—The vaginal speculum of Ambroise Paré (Sixteenth Century).

as one. Balfour and Bell, both of England, had resolutely denied the identity of the two but could not prevail against Hunter who stoutly averred their unity. Hunter's famous self-experiment checked the progress of medical knowledge for more than fifty years. He inoculated himself with "gonorrheal" pus, and when in due time a chancre and secondary manifestations developed, he had solved the question to his own satisfaction and that of the medical world. That the patient from whom he took the pus, had both gonorrhea and syphilis, did not occur to any one, and it was left to Ricord,

Fig. 139.—Regner de Graaf. (Garrison.)

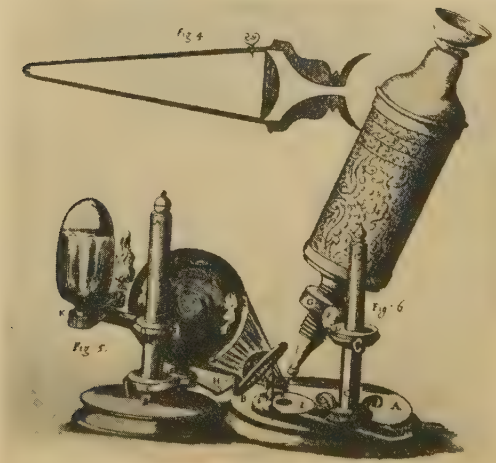

Fig. 140.—Type of microscope used by de Graaf.

of France, in 1849, to show that the two diseases were entirely separate entities.

Hunter's brother, **Sir William Hunter** (1718–1783) was the leading obstetrician of his day. He also was the first to describe retroflexion of the uterus and to practice tapping of ovarian cysts. His name appears in to-day's textbooks as the one who removed, at autopsy, the largest fibroid on record, weighing 140 pounds.

Fig. 141.—Confinement under cover. (Early parts of eighteenth century).

In the nineteenth century, gynecology made rapid strides. A number of factors contributed to this advancement. Women were no longer attended in childbirth exclusively by midwives, nor was the obstetrician compelled to conduct the delivery under cover of a cloth as in former periods (Fig. 141). This allowed for more thorough study. Furthermore, all other branches of medicine received a powerful stimulus. Improvements in the microscope led to hitherto impossible investigations into the structure of the body. In 1835, **Schleiden,** of Germany, showed that the organism of plants was composed of units, called cells. In 1838, **Schwann** proved

the same to be true in animal bodies, and in 1850 finally, **Rudolf Virchow,** of Berlin, explained to us the alterations wrought in cells by disease. To this great pathfinder most of our modern knowledge of the tissue changes in gynecological diseases can be traced.

At the beginning of the nineteenth century **Ephraim McDowell** (1771–1830), of Kentucky, performed the first

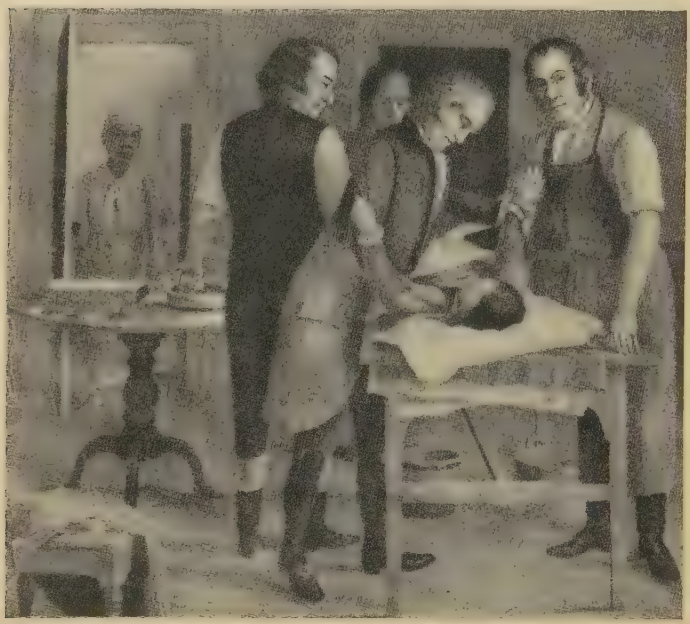

Fig. 142.—The first ovariotomy.

ovariotomy (Fig. 142). His courage and originality which were recounted in detail on page 86, justly earned for him the appellation "Father of Abdominal Surgery." Among his early followers was **Nathan Smith** (1762–1829), of Yale, who was the first to use absorbable ligature material by tying the pedicle with strips cut from a buckskin glove. The pedicle was dropped into the abdominal cavity and the incision closed without drainage. The patient recovered.

The discovery of ether and chloroform and their first employment for surgical purposes in 1846 was epoch-making. Coupled with McDowell's success in invading the abdominal cavity, it marks the beginning of the modern era in surgery. The first to avail himself of the constellation was **Sir James Young Simpson** in Edinburgh (1811–1870) (Fig. 143). Not only did he introduce the new anesthetics into obstetrical work, he also with their help extended and perfected gynecological operations.

Fig. 143.—Sir James Young Simpson. (Garrison.)

Fig. 144.—James Marion Sims. (Garrison.)

The reputation of Sir James as a gynecological surgeon was equalled by that of **James Marion Sims,** of Alabama, (1813–1883) a man whose resourcefulness was mentioned on page 73 (Fig. 144). Simpson and Sims were obstetricians and surgeons, and utilized their knowledge gained in both fields to create the new specialty of gynecology.

The daring of McDowell and the discovery of anesthetics commenced to bear full fruit only after the danger of septic infection began to be eliminated, in other words, after the

introduction of the antiseptic era in surgery. This fundamental achievement had its source directly in the field of obstetrics.

Conditions in most hospitals at that time were almost beyond belief. Lawson Tait described the Edinburgh Infirmary as he saw it in 1860.

"It was a four-storied building, badly lighted, very badly ventilated, crowded with students for many hours of the day, with a very insufficient number of nurses who were void of training; the wards stunk; they were overcrowded and marked by numerous faults in cleanliness and hygiene which would not be tolerated now in the oldest fashioned institution in the country.

"The operating table was of wood and of fabulous age. It was sometimes thought necessary to have a new mattress for the table when the stuffing was found matted together in lumps by the blood which had during many years soaked through its covering. The only correct garb of the surgeon was a frock-coat (the oldest and shabbiest in his wardrobe) which was kept in the surgeon's room and never renewed or cleansed during his twenty years of operating work.

"The Operating Theatre attendant was permitted to employ his spare time in the post-mortem room; the surgeons came straight from the dissecting room to operate, after simply washing their hands. Ligatures were used which had already been soiled by handling with blood-stained fingers, to bind up wounds in a second case. And at Edinburgh these ligatures were always worn ostentatiously by the House Surgeon, like a badge of knighthood, in a buttonhole of a coat which often rivaled that of his chief for dirt."

Under such circumstances, the slightest injury, the smallest operations were fraught with danger, and Velpeau, of France, said of this period: "A pin prick is an open door to death."

Seventy years before, **Charles White** (1728–1813), of Manchester, England, had with almost prophetic foresight concluded that foul air and surroundings, filthy bedding as well as the retention of lochia and excreta were the causes of puerperal sepsis and had banished the dreaded "putrid fever" from his lying-in ward by strict cleanliness and general hygienic measures which were as revolutionary in his day as they are self-understood with us.

His teachings, however, were forgotten by succeeding generations like so many great truths that are lost by the wayside, and it was left to **Ignaz Semmelweis,** a young interne in the Maternity Hospital in Vienna, in 1846, to recognize clearly that a definite "contagion" had to be introduced *from without* in order to produce puerperal sepsis. He maintained that cleanliness, abstinence from contamination, and the use

of antiseptic chlorine preparations would be the chief factors in the prevention of puerperal as well as surgical infection. How this great discoverer was ridiculed by the profession, how he was driven into bitterness, poverty and, finally, insanity is one of the great tragedies in medical history.

It was the merit of **Sir Joseph Lister,** of England (1827–1912) that the principle of antisepsis became generally recognized. He quickly accepted the discovery by **Louis Pasteur,**

Fig. 145.—Robert Lawson Tait. (Garrison.)

of Paris, (1822–1895) that germs were causative factors in disease, and protected wounds from bacterial contamination by liberal applications of carbolic acid solutions.

The next step in the evolution of surgery was the introduction of asepsis. Antisepsis means *destruction* of bacteria in wounds. Asepsis is the handling of wounds with germ-free implements, in other words, the *prevention* of contamination by surgical cleanliness. How this object is accomplished by means of sterilization of instruments, sponges, and dressings,

by disinfection of hands and wearing of sterile gloves need not be told in this book. Suffice it to say that both principles have survived, and that to-day we make use of both of them.

The pioneer in asepsis was **Robert Lawson Tait,** of Birmingham, England (1845–1899) (Fig. 145) who gave a tremendous impulse to the young specialty of gynecology. To him is due the operation for diseases of tubes and ovaries; he performed the first successful operation for ruptured ectopic pregnancy; he perfected McDowell's ovariotomy, and devised methods of repair of perineal tears of second and third degree.

At about the same time, **Washington L. Atlee,** in Lancaster, Pennsylvania (1808–1878) was the first to operate on uterine fibroids. **Robert Battey,** of Rome, Georgia, (1828–1859) initiated major vaginal operations, and **Edmund R. Peaslee,** of Dartmouth, New Hampshire, was the originator of normal saline solution.

Récamier, of France, (1774–1852), who invented the bivalve speculum (page 143), was also the first to design the uterine curette. This instrument was forgotten until Olshausen, of Germany, rehabilitated it in 1870. Simpson, of Scotland, had previously invented the uterine sound, and Tait, of England, had proposed a method of dilatation of the cervix, so that in the simple operation of dilatation and curettage which is now done every day, four countries have collaborated. It may be mentioned in this connection that the weighted speculum (Fig. 125) which is most commonly used, originated from **Auvard,** of Paris.

The last two decades of the nineteenth century witnessed tremendous developments in gynecology. The normal position of the uterus (page 59) was first determined by **Bernhard Sigmund Schultze,** of Germany, (1827–1919) who also taught us bimanual and rectal palpation. To **Emil Noeggerath,** of New York, (1827–1895) we owe a fuller appreciation of the destructive action of gonorrhea in the female. **Wilhelm Alexander Freund,** of Germany, (1833–1913) was the first, in 1876, to remove the uterus for cancer. His assistant **Emil Ries,** now in Chicago, proposed a much more radical and, therefore, more promising operation for the same purpose, and **Ernst Wertheim,** of Vienna, (1864–1921) so popularized this operation that it now bears his name. **Max Saenger,**

of Leipzig, designed the "classical" cesarean section, and **Johannes Pfannenstiel,** of Germany, showed us that ovarian cysts undergo malignant changes in more than 50 per cent of the cases (page 83).

An almost endless number of names of men suggests itself who, filled with the fire of scientific idealism and thoroughness, have contributed, or are still working, toward the further development of gynecology. A future historian will be better able to gauge their effect upon the progress of our specialty. Let me close this short sketch with a tribute to a man who has definitely established an influence upon his contemporaries. **Howard A. Kelly,** of Baltimore, has exerted the most profound and far-reaching effect on gynecology in America. As a teacher and an investigator he has created a scientific atmosphere in his department which has served as a model and inspiration to many.

As we look back over the foregoing pages, two facts impress themselves on our mind.

Gynecology is the child of Obstetrics and Surgery and, in the short seventy years of its existence, has attained the full stature of a mature specialty.

Even more impressive are the many different sources from which Gynecology has derived its growth. Italians and Frenchmen, Englishmen and Hollanders, Germans and Americans have erected the milestones of its evolution. Nor is this list complete by any means. Who remembers, for instance, that **Bartholin,** after whom the Bartholinian glands are named, was a Dane; that **Snegnirjieff,** of Russia, and **Thure Brandt,** of Sweden, designed methods of treatment for uterine inflammations that once were in vogue everywhere; that the burning out of a cervical cancer with red hot iron was practiced by **Avicenna,** an Arabian physician in North Africa about the year 1000? It all goes to show that Science has an all-embracing fatherland, the world; that nationalism in medicine is an absurdity; that scientific endeavor and ingenuity knows no political or geographic limits; and that the brotherhood of man which despite all religious and ethical teachings unfortunately remains a Utopia, has been realized only by the science of medicine which unites all its followers in all lands in the common service for the benefit of the human race.

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